

SHORT CIRCUITS

Newsletter of the Kent County Amateur Radio Club

March 2023

Officers		Repeaters
President	Paul Tuley N3BUH	146.970 (-) 77hz pl Dover
Vice-President	Jim Moore KC3BTV	146.910 (-) 77hz pl Camden
Secretary	Tim Reisinger KC3OO	147.300 (+) 77 hz pl N3YMS
Treasurer	Tom Libertore N3ARX	444.550 (+) 77hz pl Dover (down)
		442.450 (+) 127.3 hz pl Harrington
		449.775 (-) 114.8 hz pl N3IOC Felton

Happenings

March 9	AUXCOMM Meeting, 19:30
March 11	VE Testing, Wyoming Methodist Church, 09:00
March 14	Membership Meeting, Kent County EOC, 19:00
March 27	Emcomm Meeting, EOC, 19:00
April 11	Membership Meeting, Kent County EOC, 19:00
April 13	AUXCOMM Meeting, 19:30
April 15	Sussex Hamfest, more below
April 24	Emcomm Meeting, EOC, 19:00
April 29	VE Testing, Wyoming Methodist Church, 09:00
May 9	Membership Meeting, Kent County EOC, 19:00
May 11	AUXCOMM Meeting, 19:30
May 29	Emcomm Meeting, EOC, 19:00
June 8	AUXCOMM Meeting, 19:30
June 10	VE Testing, Wyoming Methodist Church, 09:00
June 13	Membership Meeting, Kent County EOC, 19:00
June 24-25	ARRL Field Day, details forthcoming
June 26	Emcomm Meeting, EOC, 19:00
July 11	Membership Meeting, Kent County EOC, 19:00
July 13	AUXCOMM Meeting, 19:30
July 31	Emcomm Meeting, EOC, 19:00
August 8	Membership Meeting, Kent County EOC, 19:00
August 10	AUXCOMM Meeting, 19:30
August 28	Emcomm Meeting, EOC, 19:00
September 9	VE Testing, Wyoming Methodist Church, 09:00
September 12	Membership Meeting, Kent County EOC, 19:00
September 14	AUXCOMM Meeting, 19:30
September 25	Emcomm Meeting, EOC, 19:00
October 10	Membership Meeting, Kent County EOC, 19:00
October 12	AUXCOMM Meeting, 19:30
October 30	Emcomm Meeting, EOC, 19:00
November 9	AUXCOMM Meeting, 19:30
November 14	Membership Meeting, Kent County EOC, 19:00
November 27	Emcomm Meeting, EOC, 19:00
December 9	VE Testing, Wyoming Methodist Church, 09:00

Hamfests

April 15

Sussex Amateur Radio and Electronics Expo

Sussex Amateur Radio Association

Cheer Community Center, 20520 Sand Hill Rd, Georgetown, DE 19947

Contact: Jamie Ashton , W3UC, 7446 Parker St. Pittsville MD ,21850 Pittsville, MD 21850 Phone: 410-202-7690 **Email:** ashton@mchsi.com

Talk-In: 146.090 156.7 **Website:** <http://www.radioelectronicsexpo.com/>

May 28

Memorial Day Hamfest

Maryland FM Association, Inc

Howard County Fair Grounds, 2210 Fairgrounds Road, West Friendship , MD 21794

Contact: John Elgin , WA3MNN, 518 Copley Lane Silver Spring, MD 20904

Phone: 301-641-5313 **Talk-In:** 146.76/224.76/444.0 CTCSS 107.2

Email: marylandfm@verizon.net

More hamfests listed at www.arri.org/hamfests. Check at the web site, or call the contact person, before going to any hamfest to make sure it has not canceled, as many are and have been.

Editor's Comments

I have come to realize that quite a few people in the club do not like Fox News. To each their own, however they missed a very interesting interview with Senator Bob Hall from the State of Texas. Senator Hall was formerly in the Air Force and has become very knowledgeable in the subject of EMP. For those who don't recognize the initials, that is an Electromagnetic Pulse. I usually don't watch the show mainly because on Saturday's Live PD is on and I like watching all the idiots the police have to deal with live, on TV. But I caught Dan's show mainly by accident.

Senator Hall made some with interesting observations concerning vulnerability, mainly toward the now famous balloon that floated over the country for a number of days. His contention was that a low yield nuclear device could have been housed in the balloon and set off over the country causing an EMP that would cripple many electrical devices and the power grid. For those of you that have not thought about what could occur if that was to happen, read "One Second After" by William R. Forstchen, which is readily available online, or at your local library. The book gives a scenario of what "might" happen if an EMP occurred. Senator Hall's interview fell in line with the story in the book.

So what's this got to do with us here in little old Delaware? A little ways down this newsletter Bill, N3ID, talks about situations that could disable power distribution by many causes, one being an EMP. Bill also tells us of an upcoming exercise by Sussex AUXCOMM that would address such a situation, no power. Taking part in the exercise will help you plan for a situation in which we lose power, for whatever reason. It might just be fun!

Talking about cable news outlets, CCN had an interesting report concerning the train situation in Ohio. The idea of the location where one would evacuate came up, many of the residents of New Palestine had difficulty in finding temporary housing. Since the Western side of Kent and Sussex Counties have rail service close to personnel housing, and some of the shelters that would be normally used are close to evacuation areas, keeping your "go kit" current could come in handy. Pre-positioned antennas are great unless they are attached to a shelter and can not be used and a new location would be needed for two or three weeks. Then I guess the problem would be "volunteer manpower"!!

President's Column

Hello Everyone,

As you know winter is almost over. So, we need to start thinking about summer Field Day. I can't tell you how much fun I have had over the years participating in Field Day activities.

To repeat what was discussed at the last meeting. We are making the club station available to anyone who either is limited by HOAs or license class. To come operate with a control operator present or just get on HF because of not having an HF antenna. There are several members available to assist with this project, just send out an email and indicate when. Might I remind you if this equipment isn't used it may not operate when we really need it. Please take advantage of the offer by our senior members.

Also, I've noticed that there is a young man using the repeater recently. I think his name is Gavin. He's made several QSO's with me and is anxious to talk to anyone. If you hear him please engage in conversation.

Till next time.

73,
Paul

Vice-President's Column

As some of you may know, I run an automatically controlled digital station as a third region digital traffic hub. It is entirely separate from my "everyday" station with its own antenna and is located in my basement. The station runs 24/7 cycling through preset frequencies listening for and responding to requests to send or receive traffic. It uses BPQ32 software to control an IC-718 and listens with both a VARA software modem and a PACTOR modem. It is set up with a end fed half wave antenna oriented perpendicular to my main antenna going down my driveway to a tree near the street. The digital signal is typically 20-30 watts output.

I also have a remote weather station unit mounted at the roof peak on the driveway side of my house. The remote unit sends wind data to the base unit via a tiny 915 MHz transmitter every 12 seconds and temperature data every 24 seconds.

A week or so ago we were having some windy days when, one night, my wind gauge suddenly indicated wind speeds in excess of 40 mph with gusts over 100 mph. Obviously, the reading was wrong as the house was still standing. I went out the next morning and discovered that the digital traffic hub antenna (EFHW) had been blown over about eight feet and become snagged on the remote weather sensor. Obviously at some time both the weather station transmitter and the digital station transmitter were transmitting at the same time and the weather station was totally overwhelmed resulting in the erroneous readings. I shut down the digital hub, released the antenna from the snag, on the wind readings returned to normal. Now, if solving all of our problems could be so simple.

73,
Jim KC3BTV
VP KCARC

From the Section Manager's Shack

ARE YOU RADIOACTIVE???

Are you? No I'm not asking if you glow in the dark, although might be helpful when the lights go out; and go out they will, sometime. Then what will you do? Elsewhere in this newsletter is the announcement of the "Pops in the Dark" exercise. Are you planning to take part? You might learn something important by participating.

Participating, now there is a word. Ham radio is a hobby of participating; interacting with other hams. Communicating! Are you doing that? Hope you're not one of those that laments, "There's nothing to do", and then ignores an opportunity to get on the air with other local hams. That's a self-fulfilling prophecy; if you don't participate, there will come the day when those who organize these opportunities say, "Heck, there's no interest out there, why should I put forth an effort to organize an event?"

The hobby that we get into because we thought that getting to talk to other like minded individuals could be fun. Yep, it can be, whether locally in your community, or someone in another country. And yes, that's another one of the five reasons the FCC grants you the amateur radio privileges you have, "promoting international goodwill". And you Tech licensees can do so on Ten Meters, Sunspots are up!

The American Radio Relay League, ARRL, is currently sponsoring a yearlong (2023) operating activity and contest, the Volunteers On The Air event, VOTA. So, you can chat with other hams, automatically get points for contacting one of the many ARRL volunteers that keep the league functioning. Yes, hundreds of hams like you, volunteer their time and talent to make the organization function. The catch is that you must use Log Book of the World, LoTW, which will automatically keep score for you. Again a great service provided to all hams by the ARRL. You don't have to be a member to use it. However, you might want to consider supporting the league by becoming a member. They are the advocate for ham radio nationally and internationally, and we all benefit from that effort.

Summer brings Field Day. Is your group planning, it's not too early, on getting out there and "doin' it" in the field? Maybe giving the public a chance to see and hear what we do, and maybe getting the idea that we can do this when the lights go out! We desperately want to improve our public relations and public image. And you can help that by "doin' it". Being radio-active.

You maintain your proficiency through practice. That's one way you prepare to be "doin' it" when the lights go out. When the ice storm hits. We have the motto, "When all else fails"; it's up to you to prove that those aren't just empty words.

Later, 73
John K3PFW

The Emcomm Corner

After many years of waiting, the lift cables on the antenna tower at the EOC have been replaced and now the tower has been raised resulting in the main VHF/UHF antenna moving from about 20 feet above the ground to 70 feet above ground. Early tests show that simplex coverage has been greatly improved as expected. Thanks to those who made it possible.

A basic tool kit has been put in each of the go kits and I am in the process of putting together a information resource notebook for each go kit as well. The go kits are intended to be a complete station in a box ready to deploy anywhere we can be of assistance. If anyone has suggestions to improve efficiency, feel free to let me know.

June will be here before you know it and also the start of the hurricane season. For many years we have been lucky but that "Big One" could be this year so we need to be ready. Speaking of June, it's not too soon to think about Summer Field Day, the last full weekend of the month. It's a good opportunity for

those HOA challenged to work at HF and have some practice with our equipment. Join in the planning for a fun event.

73,
Jim KC3BTV
Kent County EC

AUXCOMM News

Lights Out!

It was Christmas 1998. A winter storm had blanketed North Carolina and surrounding areas bringing icy conditions to Raleigh (our home at the time) depositing up to an inch of ice on trees and power lines resulting in widespread power outages. As many as 90,000 homes were without power in Wake County. We were one of them. For three days we hunkered in our dark and cold home, feeding logs into the fireplace day and night to keep the indoor temperature in the 50's. My wife and kids had planned a trip to visit family out of state, so I drove them to the train station (no, NOT like on Yellowstone!) to head out on their Amtrak adventure; a ride that took much longer than it should have due to frozen switches and other rail issues. As I drove back down the road towards our house after dropping them off, expecting additional hours or days in a cold, dark house, I noticed that my neighbor's lights were now on. Could it be? Yup! Power had been restored. Yay!

That was not our only extended power outage. There were several. Most due to the ice storm winter weather we seemed to experience too often, and once due to Hurricane Fran (8 days with no utility power at the house). If you ask my wife what she remembers most about our 20+ years living in North Carolina, power outages would be at or near the top of her list. It can and does, though, happen anywhere.

In December 2022 North Carolina made the news when several Duke Power electrical substations in Moore County, about 50 miles south of Raleigh, were taken out of service by rifle fire in a coordinated attack that has been classified as an act of domestic terrorism. Most residents and businesses in the county had to endure a total loss of utility power for up to 48 hours in December temperatures before power was completely restored. Similar attacks have occurred in other states including California, Washington, and Oregon. The FBI recently arrested two individuals it accuses of planning attacks on electrical substations in the Baltimore, MD area. Direct attacks on electrical infrastructure increased more than 70% in 2022!

An extreme solar flare that occurred around September 1 st, 1859 became known as the Carrington Event, named after one of the British astronomers who first recorded the flare. It is expected that Coronal Mass Ejections (CME's) associated with this solar flare directly struck Earth's magnetosphere causing global auroral displays ("northern lights"). There is a documented incident where telegraph operators in Boston, MA and Portland, ME were able to continue conducting telegraph traffic after they disconnected their battery power sources utilizing the power induced into the telegraph lines by the flare's electrical energy. There were multiple reports of telegraph operators experiencing electrical shocks and, in some cases, fires due to the excess energy in the lines.

The National Academy of Sciences, NASA, and other similar organizations have expressed their concern regarding the effects of a strong solar flare on the modern power grid. According to NASA Space Science (published Oct 26, 2010) a 2009 report by the North American Electric Reliability Corporation (NERC) and the US Department of Energy concluded that modern power systems have a "significantly enhance[d] vulnerability and exposure to effects of a severe geomagnetic storm." This actually happened in Quebec on March 13, 1989, when a geomagnetic storm much less severe than the Carrington Event knocked out power across the entire province for more than nine hours. The storm damaged transformers in Quebec, New Jersey, and Great Britain, and caused more than 200 power anomalies across the USA from the eastern seaboard to the Pacific Northwest.

Then, there's EMP (Electro-Magnetic Pulse). Essentially a "man-made" Carrington Event wherein a nuclear warhead detonated high in the atmosphere would create an energy pulse that would cause

widespread disruption and/or destruction of electrical and communications infrastructure, associated components, and electronic devices not sufficiently “hardened” against such an attack. This phenomena was first discovered during an atmospheric nuclear test in the Pacific Ocean in 1962 that impacted infrastructure in Hawaii 800 miles away!

Weather. Terrorism. Solar CME. Nuclear EMP. Any or all of these are capable of causing widespread and long-term utility power outages. We tend to take our utility power for granted since we live in an area where it is so reliable unlike other parts of the world where power outages can sometimes be a daily occurrence. Life changes in an instant, though, the moment it’s “lights out”. In the fictional novel “One Second After”, author William Forstchen takes us through the aftermath of a total power grid failure and its impact on the community of Black Mountain, NC. Truly eye-opening to the challenges modern civilization would face.

Volumes have and continue to be written about this topic. Way more than I need or want to cover here. After all, this is an Amateur Radio column! It is for all of these reasons that Sussex County AUXCOMM will be conducting “POPS in the DARK” as our next “Pop-Up” exercise. Soon. The purpose of the exercise is to test the ability of the local amateur radio community to operate in the absence of utility power. Should we experience an area-wide power outage, in addition to all of the challenges in providing water, food, comfort, and safety for ourselves and our households, we may suddenly be the “last man (or woman) standing” providing communications for administrative, tactical, and health & welfare purposes for our community.

Comfort, safety, and survivability in a disaster very much depend on the Boy Scout motto “Be Prepared”, and that includes the ham shack. Do you have the plans, equipment, and backup power source(s) to get and stay “on-the-air” for an extended period? How about a generator? How about extra fuel for that generator? Batteries? Are they fully charged? How will they get recharged? Generator? Solar? Will the sun be shining? Wind? Will the wind be blowing? How about a vehicle? Is it fully fueled? What about spare fuel? In a severe weather incident running up the road to get fuel won’t be possible. In a wide-spread utility power outage there will be nowhere to purchase fuel, or food, or water, or... Well, let’s find out. POPS in the DARK will begin without much notice and last an indeterminate number of days. Just like the real thing. Be prepared. The “rules of engagement” will be sent via email at the beginning of the exercise. I sincerely hope that many will participate, lessons will be learned, and that, when the “real thing” eventually comes around, we will all be better prepared. 73’s

Bill, N3ID

Club Happenings

City of Dover Skyline Undergoes Significant Improvement

The long-time dream of being able to again raise the antenna tower at the EOC finally became a reality on 10 FEB 23. Early on that Friday morning two cranes from Kent Signs pulled into the EOC parking lot and were met by the crew of Bob Speakman--N3HPA, Jim Moore--KC3BTV, Paul Tuley--N3BUH, and Doug Covert--KB3PRW. Led by, and under the watchful eyes of, Jon--AA1K and Adam--N3TTT Zaines the work began. The crew from Kent Signs lowered the tower and departed to another job (they would return later in the afternoon to raise the tower again). Almost immediately we ran into a problem—although the replacement cables had been purchased directly from the tower manufacturer, two of them were too short. We did not have an operational “cable stretcher”, but fortunately, we did have some spare stainless steel cable (the proper diameter) on hand. However, getting it cut to the correct length and having new ends installed proved to be a challenge. After numerous phone calls and some on-line research, we found a local company who had the right equipment to complete the job for us. After that delay the project went pretty smoothly, and late that afternoon the project was completed, the tower was raised to near full height, and the Dover skyline looks much better!

Notes:

- There is still a minor electrical problem with one of the limit switches, but that will be corrected in the near future.

- N3HPA conducted testing indicating significantly improved simplex coverage from the EOC to most of the county, including Radio-Free Smyrna.
- A new HF antenna still needs to be installed. Be ready to assist with that in the near future.

Submitted by Doug--KB3PRW

Winter Field Day

Winter Field Day was held at the EOC parking lot on Saturday 28 January and was attended by four KCARC members, Doug KB3PRW, Bob N3HPA, Jim KC3BTV, and Larry K3LT. A total of 23 contacts were made, mostly CW, on three different bands, 10, 15, and 40 meters. The point total is forthcoming and will be posted when determined by the Winter Field Day organization.

This weekend is the ARRL International DX SSB Contest, (see rules on ARRL website www.arrl.org) and is one of those that can be a lot of fun. This can be one where you can pair up with someone with a station, for those of you who are in a HOA, or come to the EOC. Fifteen and 10 meters has been open and they can be a absolute ball to work. The WFD log had many 15 meter contacts, so get on the air and be "radio active"!

New Exercise in the works

Get ready for POPS in the DARK, a Sussex County DE AUXCOMM exercise open to all local licensed amateur radio operators. This exercise is intended to test over-the-air operations through a simulated extended utility power outage emergency caused by severe winter weather conditions. Under this scenario participants must conduct their communications without the use, directly or indirectly, of utility power sources. This means that equipment used in the exercise will be powered by battery, generator, vehicle, or some other standby power source for the duration of the exercise, and operations can be conducted from participants' home locations.

This fictional area-wide emergency would restrict travel and also negatively affect local businesses meaning that fuel resupply will not be possible. Therefore, fuel for generators, vehicles, etc would be limited to that fuel that is in the tank or on hand at the beginning of the exercise. Also, it is expected that a severe winter storm would impact wired carrier internet distribution to residence locations, so that digital messaging would need to be sent via WinLink email through RF gateways or packet nodes.

The exercise will include two parts; participation with Sussex SKYWARN for simulated relevant storm related measurements and observations, and participation with both Sussex and Kent EOC's for storm damage and utility power status updates. In this fictional scenario the storm will occur on the first day of the exercise (DAY 1) and this will be the only day that the SKYWARN NET will be active (for simulated storm status). The EOC NETS will be active simultaneously with SKYWARN on DAY 1 and remain active for the remaining days of the exercise. In a true emergency situation these NETS would be staffed and active continuously. For this exercise, the NETS will have specific limited operating periods. Similarly, exercise participants are not required to be present for all periods of activity but are encouraged to participate as often as possible.

Details regarding frequencies, modes, operating schedules and other pertinent information will be sent via email prior to the start of the exercise. Remember that all communications related to the exercise must be accomplished via alternate power sources. NET communications for the exercise will test the effectiveness and durability of these alternate sources, and will provide participants further opportunities to operate in a NET environment.

Feel free to forward this email to any potentially interested radio amateurs. 73's

Bill, N3ID

Useless Facts on Month

1.5 million people call in sick to work the Monday after the Super Bowl. (I used to feel ill Monday after Field Day!)

Americans eat approximately 100 acres of pizza each day, or 350 slices per second. (And they enjoy every single bite!)

The mayor of Talkeetna, Alaska, is a cat named Stubbs. (Probably better than what we have now!)

The longest kiss ever recorded lasted 58 hours, 35 minutes and 58 seconds. (Need to know what mouthwash they used?)

Alexander the Great, Napoleon, Mussolini and Hitler, all suffered from ailurophobia, the fear of cats. (Apparently they wouldn't like Talkeetna, Alaska, or my shack either!!)

Tidbit of Information of the Month Department

Milford Remembers the Storm of 1962

Terry Rogers February 23, 2023

March 5 will mark the 61st anniversary of the Great Ash Wednesday Storm of 1962. Even today, the storm is considered one of the most devastating to hit the Delmarva Peninsula, causing \$50 million in damages which, today would total over \$465 million. The nor'easter, which coincided with a spring tide, remained stationary over the area for almost 36 hours, causing flooding that lasted more than five hours. Although most devastating in the beach towns, especially Ocean City and Rehoboth Beach, even towns inland were affected.

According to the DVD "The '62 Storm: Delaware's Shared Response," weather reports for the storm did not initially cause concern among locals. It was reported that a nor'easter would affect the region on March 5, but this was not unusual weather for Delaware during the month of March. However, by midnight on March 5, it was clear that it was not an ordinary storm.

Along the coast of Delaware, nor'easters are often more damaging than hurricanes. In fact, there has never been a direct hit from a hurricane along the Delaware shoreline, but nor'easters, named for the direction the winds circulate, are more common and more damaging. Nor'easters originate in the westerly wind belt and are considered subtropical. They derive power from temperature differences between cold and warm air masses, unlike hurricanes which need warm ocean water to survive. Hurricanes also occur in warm months while nor'easters can occur any time of the year. The most prevalent time of year, however, is autumn through spring with 63 percent occurring during this timeframe.

The storm was supposed to move up the coast and into New England, but the low was blocked by an upper level high, causing it to stall over the peninsula. The stall caused the storm to expand, increasing wind speeds significantly. The registered winds were higher than those experienced during Hurricane Hazel in 1954. Researchers into the storm today believe wind speeds reached over 112 miles per hour. The storm was so significant by midnight, Governor Elbert Carvel declared a state of emergency, ordering evacuations of the beach area. On March 9, President John F. Kennedy declared Delaware, Maryland, New Jersey and Virginia as disaster areas

At that time, there were no gauges to tell how high ocean waves were, but eyewitnesses reported waves as high as 20 to 30 feet on March 7, 1962. The high waves along the coast pushed water into the bays and tributaries, causing flooding inland as well. Towns like Milford, Milton and Millsboro suffered significant flooding as rivers rose. Because the storm stalled for almost three days, the area dealt with five high tides during the storm and one of those tides is still the highest on record for the state. Bowers and Slaughter Beach were affected by winds and high tides as well. Many of the homes built along the beaches were built using standards meant for homes built inland.

"Many people just laid joints along the marsh and built on top of them," John Moyer Jr., who was interviewed on the DVD, said. "There was no foundation and no support. We had no warning at all about

this storm. We had no idea how devastating it would be.” In fact, five of the seven fatalities in Delaware occurred in Bowers. According to Mr. Moyer, the Allen family lived on the point and, as the storm intensified, Mr. Allen attempted to evacuate his family. He placed his five children in the family car and went to convince his wife to leave. His wife was so frightened, she was reluctant to leave the home and, before she could be convinced, the car washed into the water, killing all five children.

Photos after the storm show downtown Milford streets that look more like a river. Humes Hardware and other businesses downtown suffered flooding. Near what is now Bicentennial Park, the flooding was significant, with water above the store windows. Homes in Slaughter Beach were destroyed, many falling forward onto the beach.

Even today, people recall seeing large boats along the road between Milford and Slaughter Beach. In some areas, prisoners were used to remove debris while young boys earned extra money shoveling sand or removing debris from beach homes.

The storm changed many of the building codes along the Delaware coastline, making them more stringent and restrictive in order to protect people and property. The National Weather Service says that there have been storms as strong as the 1962 storm, but none have stalled over the area for that length of time, lessening the damage. The storm led to the Delaware Coastal Zone Act in 1971 which was designed to protect the coastline from extensive coastal development. The act banned construction in the middle of beaches which had been common practice prior to this storm. The Atlantic Sands Hotel, for example, stood in the center of Rehoboth Beach before the storm, but was forced to move back to its current location when they rebuilt.

Thanks to Milford Live online

Cyber Attacks Are Not the Only Threat to Power Infrastructure

The web of wires connecting thousands of power plants to supply hundreds of millions of Americans is vulnerable to more than cyber attacks. A rise in physical attacks has also caused significant disruptions and losses.

February 02, 2023 • Naureen S. Malik, Bloomberg News

(TNS) — Attacks on U.S. power grids rose to an all-time high last year, further straining the sprawling and aging network. The number of direct physical attacks, including acts of vandalism and other suspicious activity, that potentially threatened grid reliability rose 77% to 163 in 2022 from the previous year, according data released by the U.S. Energy Department Tuesday. The incidents put the network at risk in more than three dozen states, affecting about 90,000 customers. Substations, which are responsible for stepping down high-voltage power to lower levels that can be delivered safely to homes, became high-profile targets late last year.

That the web of wires connecting thousands of power plants to supply hundreds of millions of Americans is vulnerable from physical and cyber attacks isn't new. But the rise in physical attacks is a stunning reminder of how certain targeted infrastructure can lead to significant disruptions and losses. Regulators, federal authorities and the industry have been working to identify the most vulnerable components of the grid to prevent big blackouts. The total number of reported disturbances that threaten grid reliability was little-changed last year, rising by three to 390 events. The share of physical attacks ballooned to 42% from less than a quarter of all incidents in 2021. The bulk of the rest of the disturbances are tied to severe weather or other operational issues. The number of cyber events reported rose slightly to nine last year.

The department's Office of Cybersecurity, Energy Security & Emergency Response, which collected the data, declined to provide details about the seriousness of the events, the companies involved, the types of facilities or any intentions. The Energy Department has consistently disclosed physical and cyber attacks as part of its annual grid disturbances reports going back to 2011. Earlier data back to 2000 show only a handful of incidents amid less stringent disclosure requirements.

Another unit of the Energy Department did identify some of the companies in a separate report last week. Duke's Florida utility faced a physical threat in September as did the Ravenswood Generating

Station in New York City and the Brownsville Public Utilities Board in the following weeks, the Energy Information Administration data showed.

Exelon Corp., another utility giant, was listed as having experienced a cyber event on Nov. 23, the day before Thanksgiving, according to the EIA. It's a rare disclosure. Exelon submitted the report out of "an abundance of caution" after being notified of a cyber event experienced by a vendor, not because of an incident within its own operations, spokeswoman Elizabeth Keating said in an email. Neither she nor the Energy Department provided details.

Meanwhile, a small plane that got tangled amid the wires of a transmission tower in Maryland, resulting in power outages, was categorized by the agency as a transmission interruption.

In December, up to 45,000 people in North Carolina were left in the dark after two Duke Energy Corp. substations were extensively damaged. The utility giant offered a \$75,000 reward for information that helps lead to arrests. Then on Christmas day, two men attacked four substations in Washington state, triggering blackouts for more than 15,000 people and causing \$3 million in damages.

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Thanks to Government Technology online

Earth's Core Has Stopped and May Be Reversing Direction, Study Says

The surprising finding might solve long standing mysteries about climate and geological phenomena.
byBecky Ferreira

Earth's inner core has recently stopped spinning, and may now be reversing the direction of its rotation, according to a surprising new study that probed the deepest reaches of our planet with seismic waves from earthquakes. The mind-boggling results suggest that Earth's center pauses and reverses direction on a periodic cycle lasting about 60 to 70 years, a discovery that might solve long standing mysteries about climate and geological phenomena that occur on a similar time frame, and that affect life on our planet. Of course, it must be noted this is more or less the plot of the 2003 disaster film *The Core*, but there's no need to worry about averting an impending apocalypse by nuking the center of Earth. While the core's rotation influences Earth's surface environment, scientists think this periodic spin switch is a normal part of its behavior that does not pose risks for life on our planet.

Earth's inner core is a solid metal ball that is 75 percent the size of the Moon. It can spin at different speeds and directions compared to our planet because it is nestled within a liquid outer core, but scientists are not sure exactly how fast it spins or whether its speed varies over time. Located some 3,000 miles beneath our feet, the core experiences intense heat on par with the surface of the Sun. Because it is so remote and difficult to study, the inner core remains one of the least understood environments on our planet, though it's clear that it plays a role in many processes that make our world habitable to life, such as the generation of Earth's protective magnetic field, which blocks harmful radiation from reaching the surface.

Now, Yi Yang and Xiaodong Song, a pair of researchers at Peking University's SinoProbe Lab at School of Earth and Space Sciences, have captured "surprising observations that indicate the inner core has nearly ceased its rotation in the recent decade and may be experiencing a turning-back in a multidecadal oscillation, with another turning point in the early 1970s," according to a study published on Monday in *Nature Geoscience*. "There are two major forces acting on the inner core," Yang and Song said in an email to Motherboard. "One is the electromagnetic force. The Earth's magnetic field is generated by fluid motion in the outer core. The magnetic field acting on the metallic inner core is expected to drive the inner core to rotate by electromagnetic coupling. The other is gravity force. The mantle and inner core are both highly heterogeneous, so the gravity between their structures tends to drag the inner core to the position of gravitational equilibrium, so called gravitational coupling." If the two forces are not balanced out, the inner core will accelerate or decelerate," they added. "Both the magnetic field and the Earth's rotation have a strong periodicity of 60-70 years. We believe that the proposed 70-year oscillation of the inner core is driven by the electromagnetic and gravitational forces."

Song has spent decades trying to unravel the mysteries of the inner core by studying seismic waves that pass through this distant region. He was part of the team that first reported evidence of the inner core's rotation in 1996 by measuring slight time (or "temporal") changes in these waves, which are generated by earthquakes. However, the origin of the temporal changes has been a matter of debate within the geoscience community ever since, as some scientists think the wave patterns arise from phenomena at the boundary between the outer and inner core. "Some researchers are still arguing that the temporal changes do not come from the inner-core rotation, but from localized deformation at the inner core boundary," Yang and Song said. With their new study, the pair "tried to gather more data over a longer duration to test different models."

To that end, the team studied seismic waves that passed through the inner core made by earthquakes that occurred since the 1960s. In particular, they looked for "doublet" events, which are "repeating earthquakes with nearly identical waveforms at common receivers," according to the study. By analyzing the slight temporal changes between these doublets, Yang and Song were able to probe the rotation of the inner core. As it turned out, the temporal changes reached a minimum around 2009, suggesting that the inner core had paused rotation around this time, creating seismic observations that seem more static. The team was even more astonished when they identified a similar turning point in the early 1970s, hinting that the core stops and reverses rotation on a periodic cycle. "Our results further support the inner-core rotation, and more interestingly, reveals the multidecadal pattern of the rotation," Yang and Song said to Motherboard. The results offer an unprecedented look at the searing pit of our planet, a region that continues to evade clear explanation, and it also has big implications for understanding the familiar world we inhabit on Earth's surface.

For instance, the team notes that the same multi decade cycle has also been observed in Earth's climate system, as global mean temperatures and sea level rises appear to oscillate every 60 to 70 years. The length of Earth's day, which shifts slightly over time, also seems synced to the proposed cycle. For this reason, the new findings "may" imply dynamic interactions between the deepest and shallowest layers of the solid Earth system," according to the new study. "We pointed to the existence of similar periodicity of different observations, forming a resonating system," Yang and Song told Motherboard. "The linkage, however, is less clear at the moment. The gravitational coupling between the inner core and the mantle may cause deformation at the Earth's surface, which would affect the sea level. The changes of the sea level and the Earth's rotation may affect the global atmosphere circulation and temperature. The resonance of different systems may also amplify the mutual interactions."

It's tantalizing to imagine that our most mundane experiences—such as the length of our days, and the climatic patterns that guide our local weather—might be sculpted by the rotational cycles of a weird metal ball at the center of our world. Untangling these nuances will require new models and continued observations of Earth's enigmatic central realm. The next steps are "to build quantitative models of the physical mechanisms on the multi-decadal oscillation system" and "to monitor how the rotation changes in the future," Yang and Song said. "We'd expect it to rotate westwards relative to the surface of the Earth in the coming years and decades," the pair concluded. "Seismic waves are still the best way and thus continuous operation of high-quality seismic networks is crucial in this regard."

Thanks to Motherboard from VICE online

Bouvet Island DXpedition Wraps Up

The 3Y0J activation of Bouvet Island has finished. The team concluded operations at 3:00 UTC on February 14, 2023, with around 19,000 contacts logged. The team boarded the S/V Marama and began their journey to Cape Town, South Africa. They expect to arrive by February 23.

Photos uploaded to social media by Steve Haas, N2AJ, the team's Media Officer, show the harsh reality of the operating environment. The crew operated in tents, with radios and equipment stacked on buckets.

Team Co-Leader Kenneth Opskar, LA7GIA, took to Facebook to tell a bit of their story. His post highlights the physical and technical challenges the team faced. "Pileup was difficult as our signals were weak. We had good reception and very often we called 3 to 5 times to log a QSO. Many DXers called but couldn't hear us, "how frustrating," he wrote. "We focused on fewer bands to maximize [all time new

ones], and looking at the stats, we achieved 19,000 QSOs and 50% unique calls. And many dupes! Many are satisfied, but some are also disappointed by the performance of either the team or the DQRMers."

In response to some posts on social media questioning the methods and tactics the team used, Opskar continued, "As for Bouvet, there is no guarantee at all, whether you use two helicopters or a zodiac! [We wanted] to make more contacts, but safety was and will always be more important than trying to push our limits in a risky environment."

The effort was one of the most expensive DXpeditions of all time. The team raised \$715,000 through donations and sponsorships, with each operator contributing a large sum to participate. The original plan was to operate for 22 days on the island. They had set a goal of 200,000 QSOs and hoped to operate up to 12 stations at once, across modes and bands. As Opskar referenced, getting the equipment onto the island by boat proved to be a logistical challenge. "During the second day we got some supplies in a risky zodiac operation in high swell. We lost several objects in the surf and punctured the zodiac. The conditions on the beach were terrible. Due to the coming storm, we evacuated back to [the] Marama on day 4. Despite this, we decided to scale down [the] DXpedition... We could not fight against Bouvet, but [we] had to adjust to the weather and go ashore when Bouvet allowed us," the post said.

Without the planned kit, the team was largely limited to two radios at once. The only location on the island that was safe to set up camp had a large terrain feature in the direct path toward the east coast of the United States. With antennas limited to wire dipoles, power limited to the transceivers' rated output, and a massive rock in the short path to much of North America, operations were hindered.

Bouvet Island has long been number two on Club Log's DXCC Most Wanted list, right behind North Korea. Previous excursions to the remote island have also faced operational challenges. Antarctic weather, dangerous ice, and rough terrain prevent it from being an easy activation.

Thanks to the ARRL Letter

The Dits and Dahs of Morse Code in the Digital Age

Story by Pat Hoffmann •

In the modern world of smartphones and lightning fast internet, amateur (ham) radio operators still enjoy communicating over radio by tapping telegraph keys just like the pioneers did in the earliest days of over the air communications.

Morse code may be a lost art to many, but local members of the international Straight Key Century Club still enjoy the simplicity of it. Ken Rogner has been a ham for over 45 years and still enjoys every second of it. "It's just a lot of fun. I can't say that enough."

"I use the word archaic art because it's a lot easier for us to pick up a cell phone and communicate, but with this, you need a radio and an antenna, plus a telegraph key to make it all work." Rogner says he learned Morse Code by listening to a tape in the late 1970s. "It took me about three weeks to learn, and that was at about five words a minute. The more you operate, the faster you get." Good operators can tap out 25-30 words a minute. By comparison, typical verbal conversations are about 150 words per minute. Joshua Long has been a ham for over 20 years. "If you're trying to send an encyclopedia via Morse Code, it would take a while, but operators use abbreviations for common messages and can send things rather efficiently and quickly. It's not as fast as the internet, but it's not always about speed."

Communication is made through a series of "dits" and "dahs" as they're called. Rogner says the music comes out in some of the operators because there is a rhythm to it. "Once you learn the combination of it, you can grab a cup of coffee with your left hand and tap out to a person that may be a thousand miles away or across the street." Long relishes the nostalgia of it. "Morse Code has been around for over 150 years starting with telegraphs back in the 1800s. It's a simple, fun way to contact people around the world."

Long also feels a connection to his family's past when he taps away. "Decades ago my grandfather practiced telegraphy when he worked for Grand Trunk Western in the 50s and 60s." Rogner appreciates the history of his hobby and has a collection of vintage telegraphs from around the world. Many still work to this day.

Rogner estimates there are over a million ham operators in the world and you can always find a conversation. "It can be late at night, early in the morning, or any time during the day. There are ham operators on all the time." Once you try Morse Code, many are hooked for life. "I've been a ham since 1978," Rogner says with a smile. "That's a long time, but I'm not tired of it at all. It's always a lot of fun." Long agrees. "Oh gosh. It's cool. It's pretty cool."

If you're interested in learning more about ham radio or getting involved, Jay Farlow, Volunteer Public Information Officer for the National Association for Amateur Radio suggests checking out the Fort Wayne Radio Club website which has a wealth of information or the national organization of ham radio operators, AARL which has everything anyone would want to know about the hobby.

Thanks to the ARRL Letter

Joke of the Month

The Box

An elderly pastor was searching his closet for his tie before church one Sunday morning. In the back of the closet, he found a small box containing 3 eggs and 100 \$1 bills. He called his wife into the closet to ask her about the box and its contents. Embarrassed, she admitted having hidden the box there for their entire 25 years of marriage. Disappointed and hurt, the pastor asked her, "WHY?" The wife replied that she hadn't wanted to hurt his feelings. He asked her how the box could have hurt his feelings.

She said that every time during their marriage that he had delivered a poor sermon, she had placed an egg in the box. The pastor felt that 3 poor sermons in 25 years was certainly nothing to feel bad about, so he asked her what the \$100 was for. She replied, "Each time I got a dozen eggs, I sold them to the neighbors for \$1."

Quote of the Month

"Tell me, I forget. Show me, I remember. Involve me, I understand."

Chinese proverb