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There Go the Servers: Lightning's New Perils

As Technology Spreads, Electrical Hits That Once Just Made the Lights Flicker Now Fry Computers, Phones and Web Connections

By Justin Lahart

It is summer storm season in Florida, and when lightning threatens, technicians at cable channel HSN fire up eight massive generators to ensure the home-shopping network won't lose power.

This time of year, HSN's generators get switched on two or three times a day. The St. Petersburg company is at the western edge of what meteorologists call Lightning Alley, a 50-mile-wide swath across Florida that gets more lightning than any other place in the U.S. To lose power, or even to have a brief surge or sag in its flow, could create havoc for the high-tech equipment on which the company depends.

Over the past decade, 425 people in the U.S. have been killed by lightning. Last year, fires started by lightning strikes burned 8.9 million acres of wildland. Insured losses to homeowners from lightning damage amounted to $1.1 billion.

But in the information age, lightning matters in ways it didn't before. A blip in the power supply that in the 1980s might have caused only a flickering of the lights can now fry circuits, shut down servers and deaden phone systems, effectively stranding a business.

Even if electricity lines are shielded, lightning can cause power surges through unprotected phone, cable and Internet lines -- or even through a building's walls. Such surges often show up as glitches. "Little things start not working; we see a lot of that down here," says Andrew Cohen, president of Vertical IT Solutions, a Tampa information-technology consulting firm. During the summer, Vertical gets as many as 10 calls a week from clients with what look to Mr. Cohen like lightning-related problems. Computer memory cards get corrupted, servers shut down or firewalls cut out.

New research even suggests that lightning's effect on technology can shape the course of regional economies. After analyzing lightning data for the lower 48 states, four economists from the University of Copenhagen found that those states more prone to lightning strikes tended to see worker productivity grow more slowly than in states with very little lightning.

This held true when the economists controlled for a range of other factors, including hurricane frequency, urban density and the education, age and racial characteristics of local populations.

The economists concluded that the use of computers and the Internet spread more quickly in areas less prone to lightning strikes, boosting worker output there. This lightning effect didn't exist prior to the 1990s, say researchers Thomas Andersen, Jeanet Bentzen, Carl-Johan Dalgaard and Pablo Selaya, when the advent of the Internet led to the rapid adoption of information technology in the U.S. and an accompanying surge in productivity.

But Humboldt University of Berlin economist Michael Burda, who has reviewed the paper, cautions that something other than lightning might still be at work.

"Have they really controlled for everything, and could it not be that it's something else that is correlated with lightning strikes?" Mr. Burda notes that his home state of Louisiana sees a lot of lightning, but also has a poor electrical infrastructure that could be acting as more of a hindrance to economic development now than before information technology took off.

Denmark sees about as much lightning as California, where thunderstorms are rare and there is only about one lightning strike per square mile in any given year, according to data from Vaisala Inc., an environmental and industrial measurement company. In contrast, the Tampa area sees nearly 40 strikes per square mile each year. In fact, Florida is the lightning-death capital of the U.S., with 70 fatalities over the past 10 years. Runner-up Texas had 27 lightning deaths.

World-wide, the most lightning anywhere occurs over a tiny section of Lake Maracaibo in Venezuela, recent research has found. The most lightning-prone large area, scientists say, is in Africa near where the Democratic Republic of the Congo borders Uganda, Rwanda and Burundi. "Every night, you're seeing this incredible display of lightning," says John Bates, director of the zoology department at Chicago's Field Museum, who has conducted research in the area.

Where electricity is available, researchers in the remote area are in the habit of unplugging their laptops when a storm approaches to protect against surges. Some bring uninterruptible power supply, or UPS, backups, battery-powered devices that protect against power disruptions.

The spread of technology has spawned a need for lightning-security specialists." The computer chip, the smaller it's gotten, the more susceptible it is," says Mark Harger, owner of Harger Lightning and Grounding in Grayslake, Ill. "It's been a boon to our business."

His company manufacturers systems that shield buildings from direct strikes and power surges from nearby lightning. With a steady stream of orders from financial and technology companies looking to protect their data centers, the company has gone from eight employees to 100 over the past 20 years.

TECO Energy Inc., a power company that supplies electricity in Tampa, offers "zap caps" -- devices that attach to customers' meters to prevent lightning-related power surges. The company also has more than 20,000 lightning arrestors, which direct lightning strikes around transformers and other sensitive equipment, across its system. Shield wires are strung above power lines to protect them from strikes, something that T.J. Szelistowski, who directs TECO's energy control center, says he doesn't see on power poles in less lightning-prone areas.

Lightning "isn't something that should keep people from coming to an area, but it's something that in the design of their equipment they have to consider," says Mr. Szelistowski.

Still, lightning can even catch well-prepared experts off guard.

Jeff Masters, chief meteorologist and co-founder of the Weather Underground, an Internet weather service, says he is glad his company's servers happen to be in Michigan and California, rather than Florida. But that doesn't mean lightning can't cost him.

Recently, the battery in the UPS he used to protect his computer at his Highland, Mich., home stopped working, so he plugged the computer into a power strip instead. A thunderstorm hit while he was out of town in June, and a power surge blasted through the power strip and fried his computer's circuitry.

"It was a good storm," he says. "It's sad. I wasn't even there for it."

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