



## Solar Storm Tabletop Exercise in Colorado

<http://www.npr.org/templates/story/story.php?storyId=124125001#commentBlock>

A massive solar storm could leave millions of people around the world without electricity, running water, or phone service, government officials say.

That was their conclusion after participating in a tabletop exercise that looked at what might happen today if the Earth were struck by a solar storm as intense as the huge storms that occurred in 1921 and 1859.

## Emergency Management and Response Information Sharing and Analysis Center (EMR-ISAC)

**INFOGRAM 9-10**

**March 4, 2010**

**NOTE:** This INFOGRAM will be distributed weekly to provide members of the Emergency Services Sector with information concerning the protection of their critical infrastructures. For further information, contact the Emergency Management and Response- Information Sharing and Analysis Center (EMR-ISAC) at (301) 447-1325 or by e-mail at [emr-isac@dhs.gov](mailto:emr-isac@dhs.gov).

### Solar Storms: Potential for Chaos

After participating in a recent tabletop exercise, government officials concluded that a massive solar storm could leave millions of people around the world without electricity, running water, or phone service, according to a [National Public Radio](#) article. The [Emergency Management and Response—Information Sharing and Analysis Center](#) (EMR-ISAC) examined this article to ascertain the effects of a solar storm on the operations of the nation's Emergency Services Sector (ESS).

The author explained that solar storms happen when an eruption or explosion on the surface of the sun sends radiation or electrically charged particles toward Earth. A major storm can release as much energy as one billion hydrogen bombs that destroy electrical transformers around the globe leaving nations in the northern latitudes without power, water, heat, air conditioning, etc. "Minor storms are common and can light up the Earth's northern skies and interfere with radio signals."

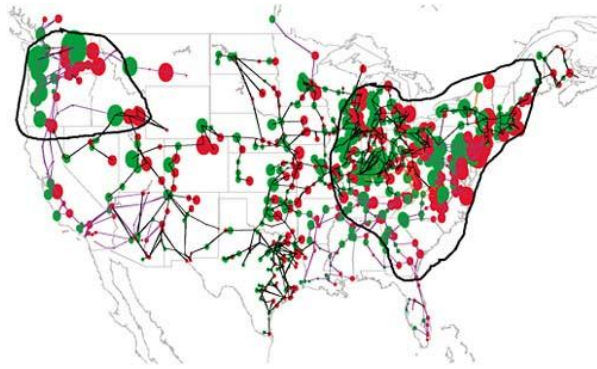
The EMR-ISAC acknowledges that our modern technological society is characterized by a complex interweave of dependencies and interdependencies among national, state, and local critical infrastructures. Therefore, because of a significant reliance on technology, critical sectors such as the ESS are vulnerable to a degradation of essential services caused by a major solar storm.

Considering the possibility of long-term power grid failure, the [National Academy of Sciences](#) provided the following recommendations for the stakeholders of critical infrastructures (e.g., emergency services):

- Develop a consequence assessment tool to perform planning analysis and training, and to assist in the identification of critical personnel and equipment requirements.
- Establish a program to assess the vulnerability of evolving critical networks and electronics equipment to long-term power grid failure, and to develop a plan for survivability and continuity of operations.

Additional information on this matter is available at the web sites of [sciencecastle.com](http://sciencecastle.com) and [scribd.com](http://scribd.com).

## SEVERE SPACE WEATHER EVENTS—UNDERSTANDING SOCIETAL AND ECONOMIC IMPACTS



A WORKSHOP REPORT Excerpt

Committee on the Societal and Economic Impacts of Severe Space Weather Events: A Workshop of the Space Studies Board

NATIONAL RESEARCH COUNCIL OF  
THE NATIONAL ACADEMIES

Washington, D.C. [www.nap.edu](http://www.nap.edu)

### POWER GRIDS

#### Future Vulnerability

Severe space weather has the potential to pose serious threats to the future North American electric power grid.<sup>2</sup> Recently, Metatech Corporation carried out a study under the auspices of the Electromagnetic Pulse Commission and also for the Federal Emergency Management Agency (FEMA) to examine the potential impacts of severe geomagnetic storm events on the U.S. electric power grid. These assessments indicate that severe geomagnetic storms pose a risk for long-term outages to major portions of the North American grid. John Kappenman remarked that the analysis shows “not only the potential for large-scale blackouts but, more troubling, ... the potential for permanent damage that could lead to extraordinarily long restoration times.” While a severe storm is a low-frequency-of-occurrence event, it has the potential for long-duration catastrophic impacts to the power grid and its users. Impacts would be felt on interdependent infrastructures, with, for example, potable water distribution affected within several hours; perishable foods and medications lost in about 12-24 hours; and immediate or eventual loss of heating/air conditioning, sewage disposal, phone service, transportation, fuel resupply, and so on. Kappenman stated that the effects on these interdependent infrastructures could persist for multiple years, with a potential for significant societal impacts and with economic costs that could be measurable in the several-trillion-dollars-per-year range.

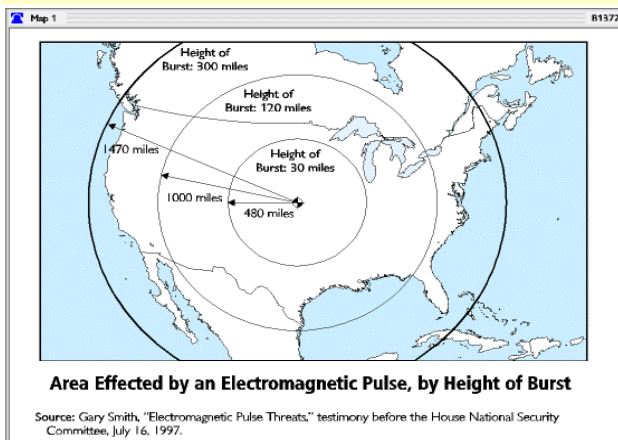
FIGURE 7.1 Scenario showing effects of a 4800 nT/min geomagnetic field disturbance at 50° geomagnetic latitude scenario. The regions outlined are susceptible to system collapse due to the effects of the GIC disturbance; the impacts would be of unprecedented scale and involve populations in excess of 130 million. SOURCE: J. Kappenman, Metatech Corp., “The Future: Solutions or Vulnerabilities?,” presentation to the space weather workshop, May 23, 2008.

# Learn to protect infrastructure from solar storms and high altitude nuclear bursts

photo: composite of SOHO (ESA & NASA) + other art  
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## Economic Impact of EMP

“Conclusion: An EMP impacting the Baltimore-Washington-Richmond region could result in a loss of economic activity between **\$34B and \$770B**. This estimate does not include the replacement cost ... or secondary effects. Policy makers could proactively limit damage and expedite recovery times through shielding activities that protect key communications and energy-related infrastructures, water supply, and key emergency response functions. Shielding 10% of critical infrastructure could reduce damage to economic productivity by **\$25B to \$185B**.” See July 21, 2008 CRS EMP Report.



**NFPA 1600**, the national fire code for business continuity, encourages businesses, utilities and communities to include disaster mitigation for EMP.

## Critical Infrastructure EMP Vulnerability Overview

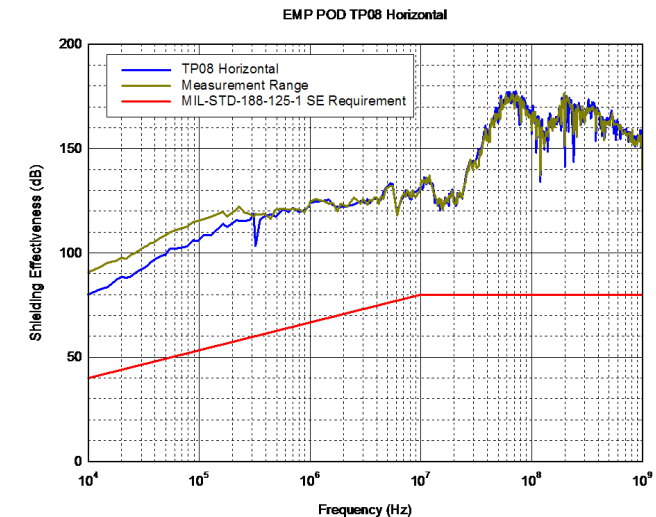
The US Congressional EMP Commission has determined:

- Electromagnetic pulse (EMP) attack could cause wide-spread damage to civilian and military electronic equipment for an extended period.”
- Little has been done by the private sector against EMP... electronic systems would be severely damaged.
- H-EMP is one of a small number of threats that has the potential to hold our society seriously at risk. The degradation of infrastructure could have irreversible effects on the country’s ability to support its population. (See 2008 Reports)

White House Action: “Defense agency submits blast-proof budget request for White House communications” By Bob Brewin [bbrewin@govexec.com](mailto:bbrewin@govexec.com) February 12, 2008

“The 2009 budget offers rare insights into ...development of a nationwide network capable of operating after exposure to a potentially crippling high-altitude electromagnetic pulse (HEMP) from a nuclear blast. WHCA disclosed in its [budget](#) that the electromagnetic pulse network, will be based on wide-area synchronous optical networking fiber rings with redundant connectivity between HEMP and non-HEMP networks.”

## Instant Access Networks’ TESTED mobile EMP-safe units exceed MIL STD 188-125.



**Instant Access Networks, LLC solutions are less expensive than custom solutions and 70% lighter than comparable military systems. See Stop-EMP.com**

# CRS Report for Congress

## High Altitude Electromagnetic Pulse (HEMP) and High Power Microwave (HPM) Devices: Threat Assessments -- Updated July 21, 2008

***Excerpts (Shows EMP - least expensive way to cause most damage):***

### **Economic Damage Estimates after Attack on Washington, D.C., Region (p. CRS-11)**

In September 2007, the Sage Policy Group of Baltimore and Instant Access Networks (IAN) published a study of the potential economic impact of a HEMP attack on the Baltimore-Washington-Richmond area. The study focuses on the economic effects of EMP experienced by a region after a high-altitude EMP pulse generated by a nuclear device detonated between 30-80 miles above ground impacting an area at least 500 miles in radius. In these instances of high-altitude EMP, no one would feel the heat or blast but merely experience the effects of the disruption or damage to the electronic and power infrastructure. **The Baltimore-Washington-Richmond area likely comprises only one-tenth of the economic loss that would occur for the total geographic area affected by a regional EMP event.**

The report presents a range of low, medium, and high estimates of economic damage -- all within bounds accepted by a broad range of EMP experts. The methodology relied on assumptions about disruption and damage to the regional electrical power system, communications systems, system control and data acquisition (SCADA) devices, and other critical infrastructure that might occur as a result of an EMP, and on the time required to repair that damage and fully restore economic activity.... **The study concluded that an EMP attack affecting the Baltimore-Washington-Richmond region could result in economic output loss potentially exceeding \$770 billion, or 7% of the nation's annual gross domestic product.**

### **Portable Data Centers and Hardening Against EMP (CRS p.14)**

Instant Access Networks (IAN), a specialized technology vendor, now offers a portable modular equipment room that reportedly can meet military specifications for EMP protection.<sup>34</sup> The IAN product uses welded metal enclosures of precise composition and thickness. A recently filed patent application involves a unique construction method to block different EMP frequencies and also reduce weight for easier portability. **This type of portable module, built and tested according to strict specifications, could possibly be mass-produced and deployed as an effective way to protect existing and future U.S. computer systems from EMP attack.<sup>35</sup>**