

# Emerging Risks: Electromagnetic Vulnerability

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## The EMP

- \* The electromagnetic pulse or EMP
  - \* Sometimes called a transient electromagnetic disturbance
  - \* A short burst of electromagnetic energy with the potential to be very disruptive of electronic devices
  - \* Wide range of EMPs ranging from the relatively benign to the catastrophic

## EMP Characteristics

- \* EMPs can transfer energy in four distinct forms:
  - \* An electric field;
  - \* A magnetic field;
  - \* Electromagnetic radiation; or
  - \* Electrical conduction
- \* When classifying EMPs, engineers describe them in terms of:
  - \* The type of energy (radiated, electric, magnetic or conducted)
  - \* The range or frequencies and
  - \* The description of the type of the pulse wave, including its shape, duration and amplitude

## Types of EMPs

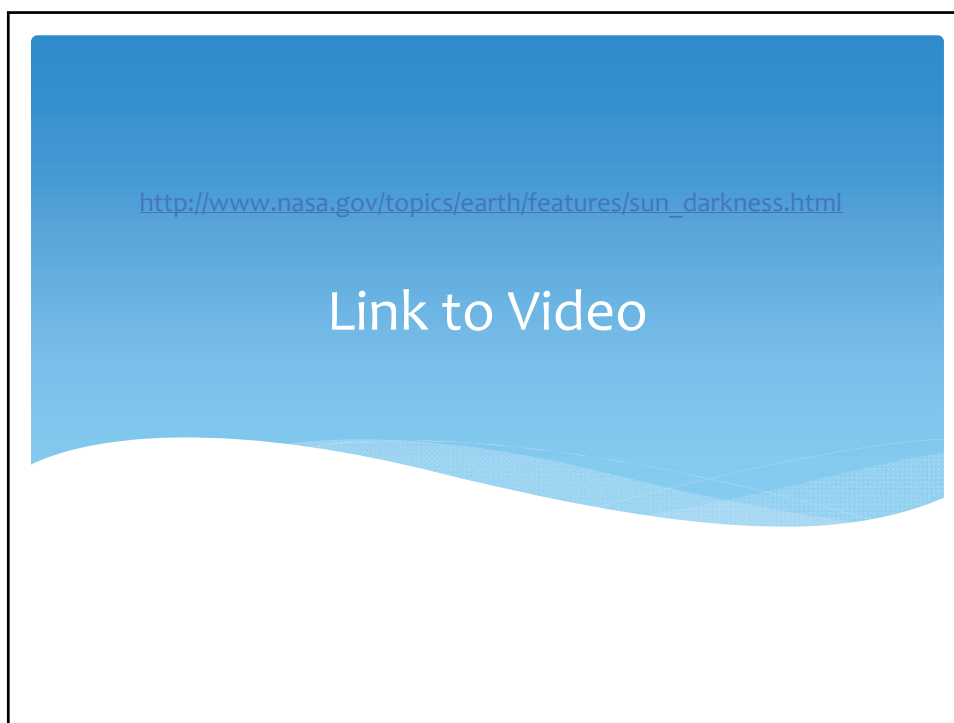
- \* Static electricity
- \* Electric arc
- \* Lightning
- \* Weaponized EMPs
- \* Solar Storms

## Risk Management & EMPs

- \* We worry about EMPs because they can damage electronic equipment, cause fires and destroy property
- \* Mega-catastrophes are possible from the weaponized EMP and the solar storm
- \* The Great Geomagnetic Storms of 1859, 1921 & 1989

### Artist Rendition of the Blackout from the Great Geomagnetic Storm of March 13, 1989

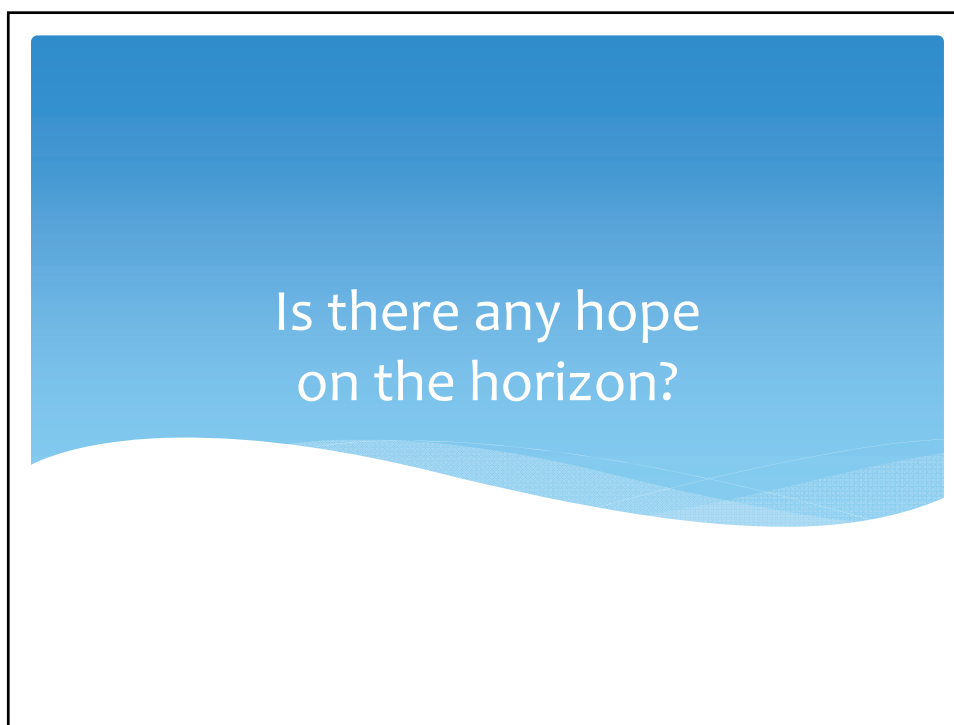




[http://www.nasa.gov/topics/earth/features/sun\\_darkness.html](http://www.nasa.gov/topics/earth/features/sun_darkness.html)

Link to Video

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Is there any hope  
on the horizon?

This slide features a blue gradient background with a white wavy pattern at the bottom. The text is centered and asks the question 'Is there any hope on the horizon?'.