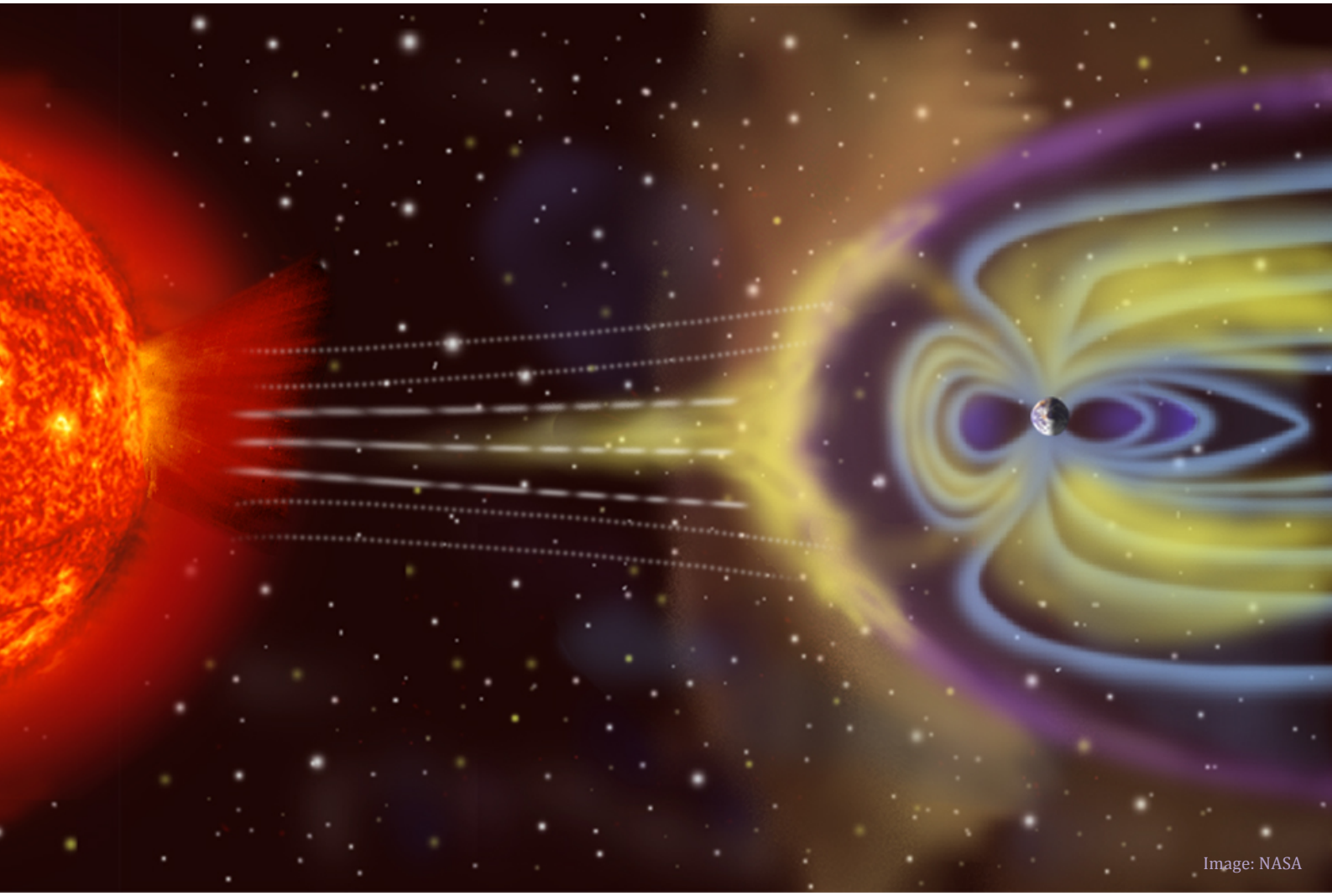
ELECTROMAGNETIC PULSE (EMP) RISK AWARENESS

(ABRIDGED VERSION)



EMP: AV_RM0140913

Biosustainable Design

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CONTENTS

High-Risk EMP Environmental Threats....3
Natural EMP Threats – Extreme Solar Storms....3
Manmade EMP Threats....4
The Need for Resilient Communities....5

REFERENCES....5

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Image source for the cover: Rendition of Earth's magnetosphere, NASA http://sec.gsfc.nasa.gov/popscise.jpg

High-Risk EMP Environmental Threats

High-risk threats, such as natural and manmade electromagnetic pulse (EMP) events, may severely compromise human survival. Under worse case scenarios large areas of the Earth could be without electricity for prolonged periods, possibly several months or years, with high loss of life.

> "*A natural EMP catastrophe or nuclear EMP attack could blackout the [US] national electric grid for months or years and collapse all the other critical infrastructures - communications, transportation, banking and finance, food and water - necessary to sustain modern society and the lives of 310 million Americans,"* Dr. Peter Vincent Pry, Member of the [US] Congressional EMP Commission and Executive Director of the Task Force on National and Homeland Security (Vicinanzo 2014).

"*… given our current state of unpreparedness, within 12 months of an EMP event, about two-thirds of the U.S. total population… would perish from starvation, disease and societal collapse*" (Pry 2011).

US Center for Security Policy President Frank Gaffney Jr. (former US Deputy Assistant Secretary of Defense for Nuclear Forces and Arms Control Policy), says such an event could cause 9 out of 10 deaths within a year from such factors (Gaffney Jr. 2011).

Natural EMP Threats – Extreme Solar Storms

Space weather is identified as a Tier 1 risk, the highest of identified 'priority risks' (UK House of Commons Defence Committee 2012).

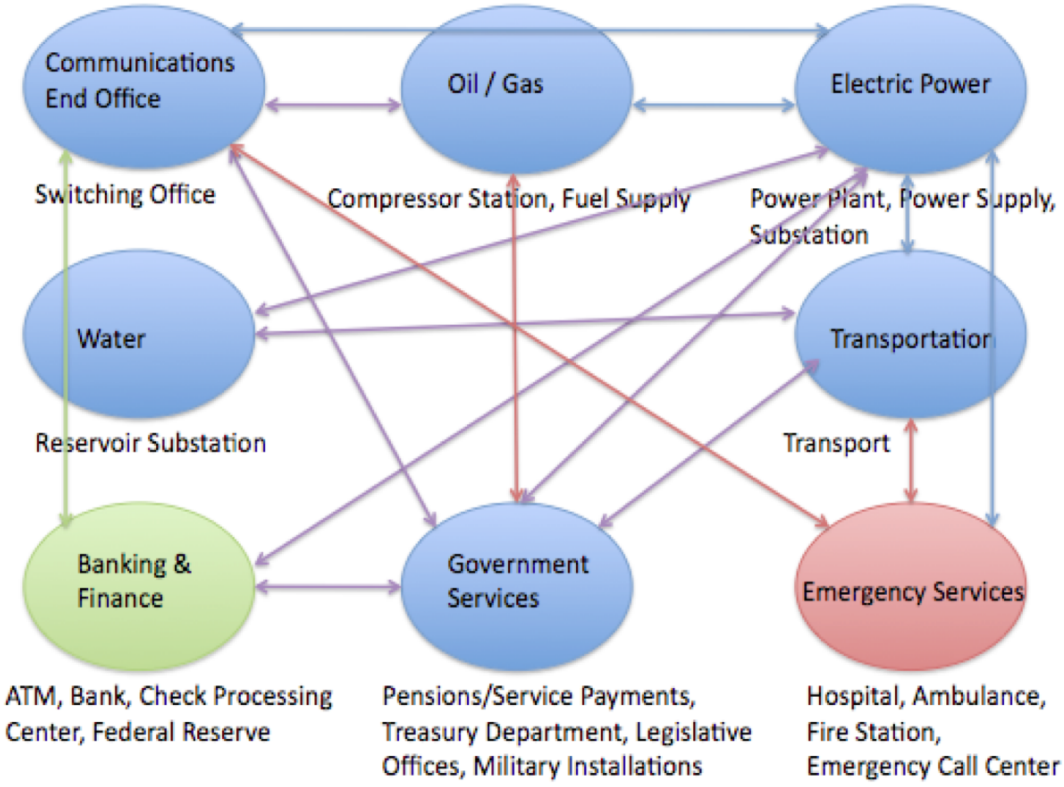
> "*The cost of an extreme space weather event, if it hits Earth, could reach trillions of dollars with a potential recovery time of 4 to 10 years. Therefore, it is paramount to the security and economic interest of the modern society to understand solar superstorms*" Professor Ying Liu, State Key Laboratory of Space Weather in China (Thomson 2014).

NASA and the NOAA have predicted that the Sun is particularly energetic at this present time (similar to the period in which the Carrington Event of 1859 [the most powerful solar storm ever recorded as hitting Earth] occurred). Experts state that a repeat of that gigantic solar storm would devastate the modern world (Lovett 2011).

It has been estimated that there is a 12% chance of a solar storm strong enough to seriously disrupt human lives hitting Earth in the next 10 years (Riley 2012).

NASA note that at present, very energetic solar storms could take place "*every couple of months instead of years*" (Mosher 2011).

Jane Lubchenco, Head of NOAA, has emphasised the need to be better prepared to avoid loss of electrical power and communications as a result of solar flares. She noted: "*This is not a matter of if, it's simply a matter of when and how big. We have every reason to expect we're going to be seeing more [potentially harmful] space weather in the coming years, and it behooves us to be smart and to be prepared*" (Moskowitz 2011).



National economies are sensitive to geomagnetic storms due to a network of interdependencies.
[Adapted from original graphic by US Department of Homeland Security] (Image source: Jamieson).

In July 2012 there was a solar storm of "unprecedented size [which] would have wiped out global electronic systems if it had occurred just nine days earlier" (Thomson 2014).

Manmade EMP Threats

Manmade EMP can cause "temporary upset and even catastrophic failure to modern electronics and electrical systems over considerable geographic areas of the Earth" (NATO 2011).

> "*A determined adversary can achieve an EMP attack capability without having a high level of sophistication*" (Foster Jr. et al. 2004).

> "*EMP is one of a small number of threats that can hold our society at risk of catastrophic consequences. … It has the capability to produce significant damage to critical infrastructures and thus to the very fabric of … society*" (Foster Jr. et al. 2004).

The threat of deliberate manmade EMP events by 'rogue nations' or terrorists is increasing (Simha 2013).

The Need for Resilient Communities

In order to successfully sustain modern civilization, designing in resiliency to high-risk threats, such as EMP, appears paramount.

> *"The consequences of the potential dangers to the electric power grid have changed dramatically over the past few decades -- as the availability of electricity has changed from being a convenience to something upon which our lives now depend. ... The knowledge and the technology of earlier times for surviving for long periods of time without electricity has been mostly lost in modern societies*" (Emanuelson 2014).

There is a moral imperative to create sustainable communities that can persist and recover from periods of disruption instigated by factors that may otherwise severely compromise human survival. Much can be done to protect humanity from high-risk events through high quality knowledge dissemination.

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