Committee/Council: Disarmament and International Security Committee
Issue: The threat to industrial countries of Electromagnetic Pulse (EMP)
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Introduction

The Electromagnetic Pulse, or most commonly abbreviated EMP, is a phenomenon which is caused by high energy explosions like a nuclear explosion, or rapidly fluctuating electromagnetic fields. It has been observed that EMPs tend to create voltage surges and damage electrical devices according to their power. This can is commonly achieved by detonating a nuclear bomb while it is still in flight. In this case, the bomb used is called an e-bomb as it only serves the purpose of creating the EMP blast. In layman's terms, an E-Bomb creates such waves, as to not only temporarily disable electrical devices, but destroy them to their core. Devices damaged by the effects of e-bombs can be:

- Vehicle control systems
- Targeting systems, on the ground and on missiles and bombs
- Communication systems
- Navigation systems
- Long and short range sensor systems

However, Electromagnetic Pulses can be released using non-nuclear means, allowing underground EMP blasts or portable, low-powered EMP weapons.

Substantially, an EMP blast of adequate power can neutralize a city from its communication and transportation systems as well as disarm it, rendering it unable to defend itself or counter-attack hostiles. It is therefore the most powerful non-obliterating mass effect weapon available in this day and age. Considering its effects, this weapon would be a huge threat to industrial countries. Imagine, some say, that you wake up and your refrigerator, your microwave, your TV, your phone and your car don't work. And so don't the neighbours', your mom's, the president's and everyone else's in the country you live in. Highly industrialized states such as the US and Russia fear this and are ruggedly prepared for such an attack. It is also said that one EMP blast from Iran could wipe out the defenses of Israel permanently leading to catastrophic consequences. Despite the little attention it had attracted until recently, the technology of Electromagnetic Pulse is not new at all. It dates at least 50 years of having been discovered and recorded as a phenomenon caused by either nuclear explosions or other means of creating a sudden burst of electromagnetic radiation. It is astonishing though how it only caught the wider public's attention in the 80's with William J. Broad's publication about it in "Science" magazine.

Definition of Key-Terms

Electromagnetic Pulse (EMP): High energy electromagnetic pulse of long wavelength radio frequency waves. The intense fields generated, particularly by a high-altitude nuclear detonation, can disable electrical and electronic equipment over a wide area.

E-Bombs: Weapons of mass destruction which specifically target electrical circuits.

HEMP: High-altitude EMP bursts; usually caused by nuclear warheads or e-bombs.

Starfish Prime: US high altitude nuclear test that knocked out street lights in Hawaii.

The K Project: Soviet high altitude nuclear test that caused electrical damages to a power plant in Karaganda.

Explosively Pumped Flux Compression Generator: The first non-nuclear means of generating EMP.

E1, E2, E3: The three components of the nuclear EMP from the fastest to the slowest. Their effects vary and are described in the “Basic EMP Physics” below.

Background Information

Brief History of the EMP

Back in the day of your grandparents, around 1945, countries with the adequate technological advance would perform “secret” nuclear tests. On July 18th 1945 however, American physicist Enrico Fermi predicted that an EMP blast would occur due to the nuclear explosion that day. Even with all the precautions they had taken, the scientists were still unable to collect some data due to paralyzed recording equipment. Similar effects were observed during British nuclear tests in 1952-1953 when “radioflash”, the British equivalent for Electromagnetic Pulse, was reported to have frozen their instruments. In July of 1962, the United States performed another nuclear test in space called Starfish Prime. The target location was 400 km above the Pacific Ocean. The test is known to have caused minor electrical damage to streetlights and other electrical devices in Hawaii, about a thousand km away from the detonation point. This test was the first part of Operation Fishbowl, a series of high altitude nuclear tests. The tests that followed gathered more data on HEMP, or High Altitude Electromagnetic Pulse. Later that year the Soviet Union, or USSR, performed their own high-altitude nuclear tests called “The K Project”. These tests were to be performed in space over the area of Kazakhstan. Even though the magnitude of the weapons was a lot smaller than the one of Starfish Prime, 300 kilotons less, its effects were much greater due to their detonation over populated areas. The E3 pulse, or geomagnetic storm, induced a power surge so powerful, that it set a power plant on fire in the city of Karaganda. This information was kept secret until the fall of the Soviet Union in 1991 when it was informally shared with American scientists. Since then, data has been collected

from many nuclear tests as of the effects of EMP on ground level, in high altitude within the atmosphere, and in space. In 1951, Andrei Sakharov discovers a way to create an EMP burst without the use of nuclear warheads. Such technology is kept classified however, until the technology was old enough to be safely revealed.

Basic EMP Physics

The Electromagnetic Pulse, as described above is a sudden burst of Electromagnetic Radiation. However, in the case of a nuclear EMP the scientific analysis is different. The burst can be broken down to its three components based on their travel speeds: E1, E2 and E3.

E1: It is the fastest component of the electromagnetic pulse. Its speed allows it to induce very high voltages and destroy computers and other electronic devices before common non-specialized protection can do anything about it. In theory, E1 is created by gamma rays knocking electrons out of their atoms and accelerating them at relativistic speeds (about 90% the speed of light) over the area affected by the bomb. This phenomenon creates the very high speed and even more highly devastating electromagnetic pulse that damages devices at a very high range.

E2: It is the pulse that follows immediately after E1. E2 has been measured to generate a less powerful electromagnetic pulse than one generated by a common lightning strike. As a result, this component would be easily countered alone. However, E1 tends to destroy or damage protection systems that would have normally protected against E2. The inevitable synergy between these two components of EMP is impressive.

E3: This component of the nuclear EMP is very similar to a geomagnetic storm caused by a solar flare. It tends to move very slowly, lasting from a few seconds to even minutes. It is characterized by its interaction with the Earth's magnetic field. This component can be met even without the others, E1 and E2.

The Fear of an EMP attack

No heating, no power, no transportation, no food, no communications, no access to medicine, no banks and credit cards. These are the main effects people all over the world fear an EMP attack would cause in an instant. It is said that the longer the contemporary man, who has otherwise been accustomed to such comforts, stays off the power grid, the more it affects his stress levels. In recent years, we see more and more fear-producing television reports and newspaper articles implying an imminent EMP attack and how countries, and especially the United States of America are not fully protected from EMP attacks, since shielding against it tends to cost a lot of money.Therefore, people blindly protest against current and previous leaders on the account of their countries be knocked back to Stone Age. However, the furthest a generalized EMP attack can get a country is 2 to 3 hundred years ago, a.k.a the Victorian Era. Back in the days of Queen Victoria, the world was getting ready for its first surge of electricity,

powered by Thomas Edison himself. It is easy to understand that a country with no infrastructure operational is vulnerable to any hostile attack. What is even more terrifying is the dependence of people to electronic devices. It is estimated that a few days after the major black-out, people will start panicking, diseases and starvation will start to rise and society will collapse. It is very much possible that apart from the potential war breaking out from this attack, terrorist organizations within the country will benefit and start ruling the streets with the police force having been left defenceless and weaker than ever. Best case scenario, shielding against EMP attacks is optimized and fully operational; the effects of the EMP are prevented.
Worst case scenario, no protection is taken, the EMP blast wipes out the entire country's infrastructure, including collateral damage, power grid and a war is won in a fortnight.

Major Countries and Organizations Involved

Countries in possession of information about EMP technology and weaponry
(More important to the issue are in bold)

- **USA**
- Britain (UK)
- France
- Germany
- Israel
- Egypt
- Taiwan
- Sweden
- Cuba
- India
- Pakistan
- Iraq under Saddam Hussein
- **Iran**
- **North Korea**

- China

- **Russia**

Organizations/Committees involved:

- Comprehensive Nuclear Test-Ban Treaty Organization (UN)
- United States EMP Commission (US)

The countries that have acquired information concerning EMP devices are seen, more or less, as a threat. This also depends on their level of belligerence and Treaties they have signed.
The Organizations/Committees involved deal with the assessment of the threat, the vulnerability of the infrastructures as well as the capability and funds of the respective country to needed to recover.

Timeline of Events

Date	Description of event
[redacted]	

1945	First US nuclear test: Electronic equipment shielded due to a scientist's expectation of an electromagnetic pulse.
[redacted]	[redacted]

1952-1953	British nuclear tests: Equipment failure due to EMP.
[redacted]	[redacted]

1962	Starfish Prime (US): Damage reported in Hawaii after high-altitude (300 km above sea level) nuclear test.
[redacted]	[redacted]

The K Project (USSR): Damage reported in Kazakhstan after a soviet nuclear test in space over its vicinity. Damage was greater than the one inflicted by Starfish Prime.

1974	Treaty on the limitation of underground nuclear weapon tests between the US and the USSR. (see below)
[redacted]	[redacted]

1976	Treaty on underground nuclear explosions for peaceful purposes between the US and the USSR. (see below)
[redacted]	[redacted]

1981	William J. Broad publishes a report on EMP making it known to the wider scientific community.
[redacted]	[redacted]

1991	The Soviet Union falls and information about The K Project is shared with US scientists.
[redacted]	[redacted]

1996	The Comprehensive Test-Ban Treaty is signed and the Comprehensive Nuclear Test-Ban Treaty Organization is formed.
[redacted]	[redacted]

	The ICJ reaches a verdict on the legality of the threat or use of nuclear weapons.

2001	The United States EMP Commission is authorized by the US Congress.
[redacted]	

2005	The US EMP Commission reports worldwide knowledge over the effects of EMP
[redacted]	

Relevant UN Treaties, Resolutions and Events

Treaty on the limitation of underground nuclear weapon tests

Signed by the United States of America and the Soviet Union at Moscow, on July 3rd 1974 (Link in the Bibliography)

Treaty on underground nuclear explosions for peaceful purposes

Signed by the United States of America and the Soviet Union at Moscow and at Washington on 28 May 1976 (Link in the Bibliography)

Comprehensive Test-Ban Treaty

26 August 1996 by the General Assembly of the United Nations (Link in the Bibliography)

ICJ Verdict on the legality of the threat or use of nuclear weapons

8 July 1996 by the International Court of Justice on the request made by the General Assembly of the United Nations (Link in the Bibliography)

Previous Attempts to solve the Issue

The threat of an Electromagnetic Pulse attack has not been fully dealt with. The only Treaty that even trivially sought to protect countries against EMP attacks was the Test-Ban Treaty. In this

Treaty it was agreed that they would establish the Comprehensive Nuclear Test-Ban Treaty Organization which would be responsible for several issues posed in the fields of nuclear technology and weaponry. In Article IV of this Treaty, listed under “Verification”, clause 11 refers to “technologies such as electromagnetic pulse”. This is the only occurrence of this phenomenon in the entire resolution. The clause states the importance of shielding against EMP attacks but does not specify the way, the magnitude of the shielding or any other detail about the EMP protection as a whole; however electromagnetic shielding was no old art on the day the Treaty was signed. This kind of treatment to this remarkably devastative technology is disturbing, especially when the entire world, even at that time, was in agony of an EMP attack as the press had been deeply interested in stories concerning EMP attacks, since the fear they produce can be surprising. Nevertheless, the United Nations is bound to act in order to resolve the problem and protect countries so that they are not thrown back to the 19th century.

Possible Solutions

This problem is yet to be dealt with. Countries directly dependent to electronics fear an EMP attack, as it would allow for a complete takeover of their country. Considering that solutions to any problem posed to a UN Committee must be dealt with after long research and after every delegate has reached thorough understanding of the problem and its variables, one can never be sure whether his resolution is complete. There are a few possible solutions:

a.) Shielding essential government and military facilities in case of an EMP attack
b.) Creating special bunkers to protect, store and salvage devices, food and medicine
c.) Updating radar technologies to have an early warning of an attack
d.) Updating Treaties, Committees and Organizations’ policies to meet today’s standards
e.) Enforcing International Law to track down any nuclear weapons
f.) Finding a balance between intervention and appeasement to stop rogue countries’ nuclear programs (North Korea, Iran, etc.)

A resolution formed by our committee is expected to deal with the issue optionally using the underdeveloped clauses above but most importantly using every delegate’s creative response to the issue as tailored to his/her country’s policy.

Further Research and Audiovisual Material

Iranian Nuke Attack on US Easy as 'EMP'? (video)

An EMP Attack could be more damaging than an Nuke Bomb (video)

EMP Attack on US Likely (video)

Expert on EMP Attacks (video)

Research Tips / Recommendations

As a delegate you have to research, not only the topic you are given, but also your country's policy. In a committee like ours the leeway for mistaken policies is very narrow and could lead to an easy rebuttal from more prepared delegates. It is for your best interest to first determine your country's external policy and then research the topic as a whole. For example, if your country is listed above, as in "Countries and Organizations Involved", you should pay close attention to your country's policy on nuclear weapons. Otherwise, pay closer attention to your allies' policies.

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http://treaties.un.org/doc/Publication/UNTS/Volume%201714/volume-1714-I-29638-English.pdf

Comprehensive Test-Ban Treaty

http://www.un.org/depts/ddar/ctbt/20fa.htm

ICJ Verdict on the legality of the threat or use of nuclear weapons
http://www.un.org/law/icjsum/9623.htm

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