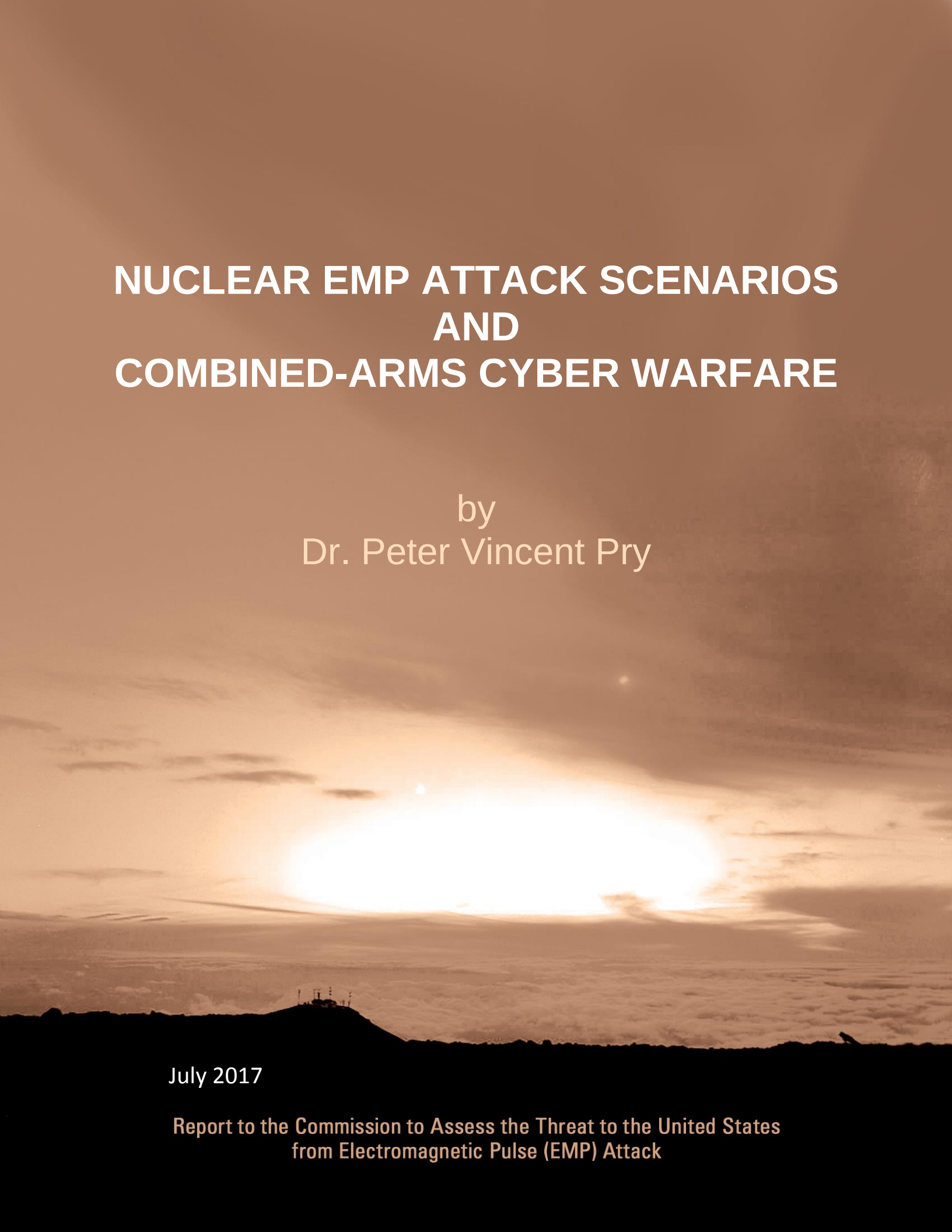


NUCLEAR EMP ATTACK SCENARIOS AND COMBINED-ARMS CYBER WARFARE

by
Dr. Peter Vincent Pry

July 2017

Report to the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack

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The cover photo depicts Fishbowl Starfish Prime at 0 to 15 seconds from Maui Station in July 1962, courtesy of Los Alamos National Laboratory.

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Acronyms and Abbreviations

AFB	air force base
C3I	command, control, communications and intelligence,
CIA	Central Intelligence Agency
DDoS	distributed denial of service
DHS	Department of Homeland Security
DMZ	demilitarized zone
EHV	extra high-voltage
EMP	electromagnetic pulse
FBI	Federal Bureau of Investigation
FERC	U.S. Federal Energy Regulatory Commission
GPS	geographic positioning system
HEMP	high-altitude electromagnetic pulse
HOB	height-of-burst
IAEA	International Atomic Energy Agency
ICBM	intercontinental ballistic missile
ISIS	Islamic State in Iraq and Syria
JCPOA	Joint Comprehensive Plan of Action
NATO	North American Treaty Organization
NMD	national missile defenses
NORAD	North American Aerospace Defense Command
PLA	People's Liberation Army
PRC	People's Republic of China
RF	radiofrequency
RMA	revolution in military affairs
SCADA	supervisory control and data acquisition
SIOP	Single Integrated Operational Plan
TACAMO	take charge and move out
THAAD	Terminal High Altitude Area Defense
UN	United Nations
USSR	Union of Soviet Socialist Republics

I A REVOLUTION IN MILITARY AFFAIRS

Nuclear EMP attack is part of the military doctrines, plans and exercises of Russia, China, North Korea, and Iran for a revolutionary new way of warfare against military forces and civilian critical infrastructures by cyber, sabotage, and EMP. This new way of warfare is called many things by many nations. In Russia, China, and Iran it is called Sixth Generation Warfare, Non-Contact Warfare, Electronic Warfare, Total Information Warfare, and Cyber Warfare. Some U.S. analysts, the very small number paying attention, call it Cybergeddon, Blackout War, or Combined-Arms Cyber Warfare.[1]

Significantly, because EMP attack entails detonating a nuclear weapon at such high altitude that no blast or other prompt effects injurious to humans are delivered, only the EMP that immediately damages only electronics, potential adversaries do not appear to regard nuclear EMP attack as an act of nuclear warfare.

Potential adversaries understand that millions could die from the long-term collateral effects of EMP and cyber-attacks that cause protracted black-out of national electric grids and other life-sustaining critical infrastructures. At least some regard this relatively easy, potentially anonymous, method of inflicting mass destruction as an attractive feature of what they describe as a "Revolution in Military Affairs."

Ignorance of the military doctrines of potential adversaries and a failure of U.S. strategic imagination, as noted in military writings of potentially hostile powers, is setting America up for an EMP Pearl Harbor.[2] Russia, China, North Korea and Iran appear to regard nuclear EMP attack as the ultimate weapon in an all-out cyber operation aimed at defeating U.S. and allied military forces on the battlefield and in a theater of operations. They also see EMP and Combined-Arms Cyber Warfare as a means of defeating entire nations by blacking-out their electric grids and other critical infrastructures for longer periods of time than technologically developed societies, including the U.S., can tolerate without major disruption and loss of life.[3]

Russia

For example, Russian General Vladimir Slipchenko in his military textbook *Non-Contact Wars* describes the combined use of cyber viruses and hacking, physical attacks, non-nuclear EMP weapons, and ultimately nuclear EMP attack against electric grids and critical infrastructures as a new way of warfare that is the greatest revolution in military affairs (RMA) in history. Slipchenko sees EMP as such a departure from traditional ways and means of warfare that he

[1] While many analysts are paying attention to cyber warfare, narrowly defined as the use of computer viruses and hacking and other such techniques, relatively few conceive of "cyber warfare" as potential adversaries do— as Combined-Arms Cyber Warfare entailing coordinated use of computer viruses etc., sabotage and kinetic attack, non-nuclear and nuclear EMP weapons. Dr. Peter Vincent Pry, *Blackout Wars* (Task Force on National and Homeland Security, 2015), Chapter II "The Blackout War".

[2] For Example: Zhang Shouqi and Sun Xuegui, "Be Vigilant Against 'Pearl Harbor' Incident In The Information Age" Jiefangjun Bao (Official newspaper of the PRC People's Liberation Army, May 14, 1996).

[3] Ambassador R. James Woolsey, "Heading Toward an EMP Catastrophe" Statement for the Record before the Senate Homeland Security and Governmental Affairs Committee, July 22, 2015.

describes EMP weapons and warfare as "based on new physical principles"—a phrase that has become ubiquitous in Russian literature to describe the RMA that is EMP:

> *"In practically all preceding generations of wars…weapons were employed that acted against targets primarily by kinetic, chemical and thermal energy. In addition to these arms…new ones will also appear in…wars of the future….Weapons based on new physical principles having an electromagnetic effect will see considerable development. They will represent a form of casualty and damage producing effect on targets through the energy of electromagnetic emissions of various wavelengths and levels of power generated by radio frequency and laser weapons and by means of electronic countermeasures using a conventional or high-altitude nuclear burst….Depending on the power of emission, such weapons will be capable of…suppressing practically all classic electronic equipment…causing the melting or evaporation of metal in the printed circuit boards…or causing structural changes of electronic elements…"*[4]

Like Nazi Germany's Blitzkrieg ("Lightning War") Strategy that coordinated airpower, armor, and mobile infantry to achieve strategic and technological surprise that nearly defeated the Allies in World War II, the New Blitzkrieg is, literally and figuratively, an electronic "Lightning War" so potentially decisive in its effects that an entire civilization could be overthrown in hours, although it would take longer for the full consequences to be realized.

According to General Slipchenko, EMP and the new RMA renders obsolete modern armies, navies and air forces. For the first time in history, small nations or even non-state actors can humble the most advanced nations on Earth.

An article in Military Thought, the flagship journal of the Russian General Staff, "Weak Points of the U.S. Concept of Network-Centric Warfare" points to nuclear EMP attack as a means of defeating the United States:

> *"American forces may be vulnerable to electronic warfare attacks, in particular, an electromagnetic pulse that is a brief powerful electromagnetic field capable of overloading or destroying numerous electronic systems and high-tech microcircuits that are very sensitive to the electromagnetic field, even if transmitted from a distance. A single low-yield nuclear weapon exploded for this purpose high above the area of combat operations can generate an electromagnetic pulse covering a large area and destroying electronic equipment without loss of life that is caused by the blast or radiation."*[5]

Moreover: "Today, too, a considerable body of administrative information in the U.S. armed forces goes through the civilian Internet. Many commercial communication satellites,

[4] General Vladimir Slipchenko, Non-Contact Wars (Moscow: January 1, 2000).
[5] Colonel A.V. Kopylov, Weak Points of the U.S. Concept of Network-Centric Warfare" Military Thought, Volume 3, 2011.

particularly satellites in low orbits, can have their functions impaired or they can be disabled by electromagnetic shocks from high altitudes."[6]

According to another Russian article: "Nuclear war strategy has already planned nuclear explosions at an altitude of 50-100 km to destroy enemy satellites' electronic instruments with electromagnetic pulse":

> *"There are now 683 space craft in near-earth orbit. Of these about 150 are Russian and about 400 American. In the estimation of specialists, for every 100 of our 'purely' military espionage artificial earth satellites there are 300 civilian satellites. Clearly, this discrepancy will increase both quantitatively and qualitatively (considering the state of the Russian military-industrial complex)….Nuclear war strategy has already planned nuclear explosions at an altitude of 50-100 km to destroy enemy satellites' electronic instruments with an electromagnetic pulse."*[7]

A 2015 article from Russia's A.A. Maksimov Scientific Research Institute for Space Systems, alludes to low-yield nuclear enhanced-EMP as the most effective cyber weapon: "Even more effective are remote-controlled cyber weapons in the nuclear variant, but in this case a warhead is required with a capacity many times smaller by comparison with the charges of the typical strategic missiles."[8]

Russia made a thinly veiled EMP threat against the United States on May 2, 1999, in an apparent effort to blackmail the U.S. to stop the Balkans War. During the spring of 1999, tensions between the United States and Russia rose sharply over Operation ALLIED FORCE, the North American Treaty Organization (NATO) bombing campaign against Yugoslavia. A bipartisan delegation from the House Armed Services Committee of the U.S. Congress met at Vienna with their Russian counterparts on the Duma International Affairs Committee, headed by Chairman Vladimir Lukin. The object of the meeting was to reduce U.S.-Russia tensions and seek Russian help in resolving the Balkans War.

On May 2, during the Vienna meeting, Chairman Lukin and Deputy Chairman Alexander Shabanov chastised the United States for military aggression in the Balkans, and warned that Russia was not helpless to oppose Operation ALLIED FORCE. LUKIN—"Hypothetically, if Russia really wanted to hurt the United States in retaliation for NATO's bombing of Yugoslavia, Russia could fire a submarine launched ballistic missile and detonate a single nuclear warhead at high-altitude over the United States. The resulting electromagnetic pulse would massively disrupt U.S. communications and computer systems, shutting down everything. No internet. Nothing." SHABANOV—"And if that didn't work, we'd just launch another missile."[9]

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[6] Ibid.
[7] Aleksandr Khokhlov, "If There Are Star Wars Tomorrow," Novyye Izvestiye, November 5, 1997, p. 2.
[8] Department Chief Dr. Grigoriy Vokin, "Remote Custodian. Warheads with Artificial Intelligence for Reconnaissance, Guaranteed Destruction of Targets, and Human Rescue" A.A. Maksimov Scientific Research Institute (2015).
[9] HASC Transcript On Vienna Conference (May 2, 1999). Interview with Vienna Conference participants Rep. Curt Weldon and Rep. Roscoe Bartlett.

"Super-EMP is a…First-Strike Weapon"

"The further direction of the work on the development of Super-EMP was associated with the increase of its kill effect by focusing Y-radiation, which should have resulted in an increase of the pulse's amplitude. These properties of Super-EMP make it a first strike weapon, which is designed to disable the state and military command and control system, the economy, ICBMs, especially mobile based ICBMs, missiles on the flight trajectory, radar sites, spacecraft, energy supply systems, and so forth. So, Super-EMP is obviously offensive in nature and is a destabilizing first-strike weapon."

"The Russian nuclear component relies on the Super-EMP factor, which is the Russian response to U.S. nuclear blackmail."

From Aleksey Vaschenko, "A Nuclear Response To America Is Possible"
Zavtra (November 1, 2006).

China

China's military doctrine sounds an identical theme about the revolutionary implications of EMP and Information Warfare. According to People's Liberation Army (PLA) textbook *World War, the Third World War—Total Information Warfare*, written by Shen Weiguang (allegedly, according to the People's Republic of China (PRC), the inventor of Information Warfare) "Therefore, China should focus on measures to counter computer viruses, nuclear electromagnetic pulse...and quickly achieve breakthroughs in those technologies...":

> *"With their massive destructiveness, long-range nuclear weapons have combined with highly sophisticated information technology and information warfare under nuclear deterrence....Information war and traditional war have one thing in common, namely that the country which possesses the critical weapons such as atomic bombs will have "first strike" and "second strike retaliation" capabilities....As soon as its computer networks come under attack and are destroyed, the country will slip into a state of paralysis and the lives of its people will ground to a halt. Therefore, China should focus on measures to counter computer viruses, nuclear electromagnetic pulse...and quickly achieve breakthroughs in those technologies…in order to equip China without delay with equivalent deterrence that will enable it to stand up to the military powers in the information age and neutralize and check the deterrence of Western powers, including the United States."*

An article from the People's Republic of China's Air Force Engineering University describes nuclear EMP weapons as the most powerful and effective variant of electronic warfare weapons for waging Information Warfare. Nuclear and non-nuclear EMP weapons in the context of Information Warfare are the crucial instruments for implementing this Revolution in Military Affairs*:*

> *"In future high-tech warfare under informatized conditions, information warfare will span multiple dimensions, including ground, sea, air, and the EM spectrum. Information superiority has already become central and crucial to achieving victory in warfare…If the communications equipment used for the transmission of battlefield information were attacked and damaged by an opponent's EMP weapons, then the one attacked would face the danger of disruption in battlefield information transmission. EMP severely restricts the tactical performance and battlefield survivability of informatized equipment."*[10]

Moreover, the article clearly makes a distinction between nuclear weapons and nuclear EMP weapons, describing the latter as "a new type of weapon" like non-nuclear EMP weapons, all for waging Information Warfare:

> *"As opposed to conventional and nuclear weapons, EMP weapons are a new type of weapon capable of causing mass destruction by instantly releasing high-intensity EMP…They can interfere, damage, and overheat electronics, resulting in logic circuit dysfunctions, control malfunctions, or total failure. The unique destructive effect that EMP have on electronic equipment was unintentionally discovered by the United States in the 1960s during a nuclear test. In July 1962, the United States conducted a high-altitude nuclear explosion in the Pacific Ocean. This…unexpectedly overloaded the Honolulu power grid in Hawaii, 1,400 km away, even overheating lightning protection devices on powerlines. On a battlefield, this new-type weapon will cause devastating damage to electronic systems, including computers, communications and control systems, and radars, resulting in immeasurable losses."*[11]

Furthermore, according to the article: "There are 3 types of military EMP based on pulse sources: the first is the high-altitude EMP (HEMP) produced by the detonation of a low yield nuclear bomb in the atmosphere at high-altitude; the second is…produced by high explosives and related devices; the third is the HPM…produced by HPM devices such as magnetrons and vircators." Nuclear EMP weapons are, or include, Enhanced-EMP or so-called Super-EMP weapons designed to produce gamma rays and high-frequency E1 EMP: "HEMP weapons are a type of weak nuclear explosive EMP bomb that produces EMP through the detonation of low-yield nuclear bombs at high-altitudes (70 to 100 km above ground)." The E1 EMP field "produced by nuclear EMP is about 10 to 100 kV/m and can penetrate and melt any electronic components."

Another article "Special Means of Warfare in the Information Age" notes that Information Warfare includes computer viruses and nuclear EMP attack, and can be used to collapse an enemy's electric grid and other national critical infrastructures:

> *"The methods used to achieve destruction or manipulation of the 'byte' can be 'atomic'—such as electromagnetic pulse bombs and so on—or can be 'byte' type—such as computer viruses….The so-called strategic information warfare is the use*

[10] Zhao Meng, Da Xinyu, and Zhang Yapu, "Overview of Electromagnetic Pulse Weapons and Protection Techniques Against Them" Winged Missiles (PRC Air Force Engineering University: May 1, 2014).
[11] Ibid.

of destruction or manipulation of the flow of information on a computer network to destroy the enemy's telephone network, fuel pipelines, electric grid, transportation control system, national funds transfer system, various bank clearance systems, and health and sanitation systems, in order to achieve a strategic goal."[12]

A January 2016 article "General Trend of the Worldwide Revolution in Military Affairs" by China's National Security Policy Committee sees "electromagnetic pulse bombs" among the new "disruptive technologies" that "can change the 'rules of the game'" by disrupting U.S. military "precision warfare capabilities centered on information technology" thereby sounding "the horn of a new round of revolution in military affairs."[13]

An article in the newspaper of the PLA notes that "The United States is more vulnerable than any other country in the world" to attacks by EMP and Combined-Arms Cyber Warfare:

"Some people might think that things similar to the 'Pearl Harbor Incident' are unlikely to take place during the information age. Yet it could be regarded as the 'Pearl Harbor Incident' of the 21st century if a surprise attack is conducted against the enemy's crucial information systems of command, control, and communications by such means as the electronic warfare, electromagnetic pulse weapons, telecommunications interference and suppression, computer viruses, and if the enemy is deprived of the information it needs as a result. Even a super military power like the United States, which possesses nuclear missiles and powerful armed forces, cannot guarantee its immunity…In their own words, a highly computerized open society like the United States is extremely vulnerable to electronic attacks from all sides. This is because the U.S. economy, from banks to telephone systems and from power plants to iron and steel works, relies entirely on computer networks….When a country grows increasingly powerful economically and technologically…it will become increasingly dependent on modern information systems….The United States is more vulnerable to attacks than any other country in the world…"[14]

Iran

Iran in more than 20 passages of a recently translated military textbook ironically titled *Passive Defense* (2010) endorses the theories of Russian General Slipchenko and the potentially decisive effects of nuclear EMP attack to defeat decisively an adversary. Ambassador R. James Woolsey, former Director of the Central Intelligence Agency (CIA), writes:

"'Death to America' is more than merely an Iranian chant—Tehran's military is planning to be able to make a nuclear EMP attack....Rep. Trent Franks quoted from an Iranian military textbook recently translated by the Defense Intelligence Agency's National Intelligence University...The official Iranian military textbook advocates a revolutionary new way of warfare that combines coordinated attacks

[12] Wang Xiaodong, "Special Means of Warfare in the Information Age," Jianchuan Zhishi, June 30, 1999.
[13] Li Bingyan, "General Trend of the Worldwide Revolution in Military Affairs" PRC National Security Policy Committee (January 2016).
[14] Zhang Shouqi and Sun Xuegui, Jiefangjun Bao, 14 May 1996.

> *by nuclear and non-nuclear EMP weapons, physical and cyber-attacks against electric grids to blackout and collapse entire nations. Iranian military doctrine makes no distinction between nuclear EMP weapons, non-nuclear radio-frequency weapons and cyber-operations—it regards nuclear EMP attack as the ultimate cyber weapon."*[15]

EMP is most effective at blacking-out critical infrastructures, while it does not directly damage the environment or harm human life, according to Iran's *Passive Defense*:

> *"As a result of not having the other destructive effects that nuclear weapons possess, among them the loss of human life, weapons derived from electromagnetic pulses have attracted attention with regard to their use in future wars...The superficiality of secondary damage sustained as well as the avoidance of human casualties, serves as a motivation to transform this technology into an advanced and useful weapon in modern warfare."*[16]

Ambassador Woolsey notes: "Because EMP destroys electronics directly, but people indirectly, it is regarded by some as Shariah-compliant use of a nuclear weapon. *Passive Defense* and other Iranian military writings are well aware that nuclear EMP attack is the most efficient way of killing people, through secondary effects, over the long run. The rationale appears to be that people starve to death, not because of EMP, but because they live in materialistic societies dependent upon modern technology."[17]

An Iranian political-military journal, in an article entitled "Electronics To Determine Fate Of Future Wars," states that the key to defeating the United States is EMP attack and that, "If the world's industrial countries fail to devise effective ways to defend themselves against dangerous electronic assaults, then they will disintegrate within a few years.":

> *"Advanced information technology equipment exists which has a very high degree of efficiency in warfare. Among these we can refer to communication and information gathering satellites, pilotless planes, and the digital system....Once you confuse the enemy communication network you can also disrupt the work of the enemy command and decision-making center. Even worse, today when you disable a country's military high command through disruption of communications you will, in effect, disrupt all the affairs of that country....If the world's industrial countries fail to devise effective ways to defend themselves against dangerous electronic assaults, then they will disintegrate within a few years....American soldiers would not be able to find food to eat nor would they be able to fire a single shot."*[18]

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[15] "A Shariah-Approved Nuclear Attack" Washington Times, September 15, 2015.
[16] Ibid. Army of the Islamic Republic of Iran, *Passive Defense: Approach to the Threat Center* (Tehran: Martyr Lt. General Sayad Shirazi Center for Education and Research, Spring 2010).
[17] Ibid
[18] Tehran, Nashriyeh-e Siasi Nezami, December 1998 -January 1999.

Iran reportedly has attempted to purchase radiofrequency weapons from Russia, displaying interest in the kind of capability that nuclear EMP would better provide.[19]

Ironically, while electric power lobbyists are fighting against EMP protection of the U.S. grid in Washington, the Iranian news agency MEHR reported that Iran is violating international sanctions and going full bore to protect itself from a nuclear EMP attack:

> *"Iranian researchers...have built an electromagnetic pulse filter that protects the country's vital organizations against cyber attack. Director of Kosar Information and Communication Technology Institute Saeid Rahimi told a news correspondent that the EMP filter is one of the country's boycotted products and until now procuring it required considerable costs and various strategies. "But recently Kosar ICT...has managed to domestically manufacture the EMP filter for the very first time in this country," said Rahimi. Noting that the domestic EMP filter has been approved by security authorities, Rahimi added "the EMP filter protects sensitive devices and organizations against electromagnetic pulse and electromagnetic terrorism." He also said the domestic EMP filter has been implemented in a number of vital centers in Iran."*[20]

Artwork for this Iranian article depicts a satellite orbiting above the Earth apparently making a nuclear EMP attack. Ambassador Henry Cooper, former Director of the Strategic Defense Initiative, has warned repeatedly that some Iranian satellite launches appear to be practice for making a nuclear EMP attack on the United States.[21]

North Korea

North Korea appears to have practiced the military doctrines described above against the United States—including by simulating a nuclear EMP attack against the U.S. mainland.[22]

Following North Korea's third illegal nuclear test in February 2013, North Korean dictator Kim Jong-Un repeatedly threatened to make nuclear missile strikes against the U.S. and its allies. In what was then the worst ever nuclear crisis with North Korea, that lasted months, the U.S. responded by beefing-up National Missile Defenses and flying B-2 bombers in exercises just outside the Demilitarized Zone to deter North Korea.[23]

North Korea's first satellite, the KMS-3, was launched successfully on December 12, 2013, exactly two months before, and probably in anticipation of, North Korea's illegal nuclear test on February 12, 2013. [redacted]

[19] Roger Fontaine, "Iran Said to be Developing New Class of Weapons," Washington Times (14 July 1997), p. A10. Iran Brief (Middle East Data Project: 3 July 1997).
[20] "Iran Builds EMP Filter For 1st Time" MEHR News Agency, June 13, 2015.
[21] Ambassador HenryF. Cooper, "Another Satellite Launch By Iran" High Frontier, February 23, 2016; "Quick Fixes to Counter the Existential EMP Threat" High Frontier, July 29, 2014.
[22] "EMP Threat From North Korea, 2013" Family Security Matters, April 27, 2014.
[23] "U.S. Warns North Korea With Stealth Bomber Flights," Wall Street Journal, March 29, 2013.

[redacted][24]

However, the study was suppressed as "politically incorrect" because it contradicted public statements by President Obama and his administration that North Korea could not make a nuclear missile strike on the U.S.[25]

On April 9, 2013, North Korea's KMS-3 satellite orbited over the U.S. moving from south to north on a polar trajectory that evades U.S. early warning radars and National Missile Defenses, at the near optimum altitude and location to place an EMP field over all 48 contiguous United States.[26]

On April 16, 2013, the KMS-3 again orbited over the Washington, D.C.-New York City corridor where, if the satellite contained a nuclear warhead, it could project the peak EMP field over the U.S. political and economic capitals and collapse the Eastern Grid, which generates 75 percent of U.S. electricity. On the same day, parties unknown used AK-47s to attack the Metcalf transformer substation that services San Francisco, the Silicon Valley, and is an important part of the Western Grid. Blackout of the Western Grid, or of just San Francisco, would impede U.S. power projection capabilities against North Korea.[27]

In July 2013, a North Korean freighter (the Chong Chon Gang) transited the Gulf of Mexico with SA-2 missiles in its hold, mounted on their launchers hidden under bags of sugar, discovered only after the freighter tried to return to North Korea through the Panama Canal.[28] Although the missiles were not nuclear-armed, they are designed to carry a 10 kiloton warhead, and could execute the Congressional EMP Commission's nightmare scenario of an anonymous EMP attack launched offshore from a freighter. All during this period, the U.S. electric grid and other critical infrastructures experienced various kinds of cyber-attacks, as they do continuously every day.

On January 6, 2016, North Korea provoked another nuclear crisis with its fourth illegal nuclear test of what it claimed was an H-Bomb. On February 7th, again amidst threats to make a nuclear missile strike on the United States, Pyongyang orbited another satellite, the KMS-4, on the same polar trajectory as the KMS-3.[29]

North Korea now has two satellites orbiting over North America on trajectories optimized to evade U.S. Ballistic Missile Early Warning radars and missile defenses and make a surprise EMP

[redacted][24]

[25] F. Michael Maloof, "DHS Study: North Korea Capable Of EMP Attack On U.S.," World Net Daily (April 9, 2014).

[26] KMS-3 is NORAD's acronym for North Korea's satellite Kwangmyongsong-3 (Lodestar-3 or Guiding Star-3), a name richly symbolic for Korean mythology and the deification of Kim Jong-Un who according to official propaganda was born on Mt. Paeku under a newly appeared bright guiding star, signifying the birth of a great general.

[27] Rebecca Smith, "Assault On California Power Station Raises Alarm On Potential For Terrorism," Wall Street Journal, February 5, 2014.

[28] "North Korean Ship Yields Worrisome Cargo," Wall Street Journal, July 17, 2013; "North Korea's Cuban Missile Crisis" 38 North, August 1, 2013.

[29] "North Korea May Have Tested Components Of A Hydrogen Bomb" CNN, January 29, 2016; "North Korea Launches 'Satellite," Sparks Fears About Long-Range Missile Program," Washington Post, February 6, 2016.

attack, if the satellites are nuclear-armed. The satellites could be nuclear-armed and constitute a constant EMP threat, the 21st Century equivalent of "battleship diplomacy."

Kim Jong-Un has threatened to reduce the United States to "ashes" with "nuclear thunderbolts" and threatened to retaliate for U.S. diplomatic and military pressure by "ordering officials and scientists to complete preparations for a satellite launch as soon as possible" amid "the enemies' harsh sanctions and moves to stifle" the North.[30] North Korean press (for example in Rodong Sinmun; March 7, 2016) asserts readiness for "any form of war" and includes their satellite with "strengthening of the nuclear deterrent and legitimate artificial satellite launch, which are our fair and square self-defensive choice." Moreover: "The nuclear [weapons] we possess are, precisely, the country's sovereignty, right to live, and dignity. Our satellite that cleaves through space is the proud sign that unfolds the future of the most powerful state in the world." The same article, like many others, warns North Korea makes "constant preparations so that we can fire the nuclear warheads, which have been deployed for actual warfare for the sake of national defense, at any moment!"

North Korea used a non-nuclear EMP weapon, a "radiofrequency cannon" purchased from Russia, to threaten and stop air traffic flying into Seoul, South Korea's capitol in December 2010; March 9, 2011; and April-May 2012. The attacks caused widespread communications blackouts and prevented automobiles from starting in South Korean communities along the Demilitarized Zone.[31]

On September 2, 2017, North Korea according to state media detonated an H-Bomb that is also a Super-EMP weapon: "The H-Bomb, the explosive power of which is adjustable from tens of kilotons to hundreds of kilotons, is a multi-functional thermonuclear nuke with great destructive power which can be detonated at high altitudes for super-powerful EMP according to strategic goals." (KCNA September 2, 2017)

The Gathering Storm

Just as Nazi Germany practiced the Blitzkrieg in exercises and during the Spanish Civil War (1936-1939), before surprising the Allies in World War II, so terrorists and state actors appear to be practicing what might be called "blackout warfare" by attacking electric grids. For example:

- On October 27, 2013, the Knights Templars, a criminal drug cartel, blacked-out Mexico's Michoacan state and its population of 420,000, so they could terrorize the people and paralyze the police. The Knights, cloaked by the blackout, entered towns and villages and publicly executed leaders opposed to the drug trade.[32]
- On June 9, 2014, Al Qaeda in the Arabian Peninsula used mortars and rockets to destroy transmission towers, plunging into darkness all of Yemen, a country of 16 cities and 24 million people. It is the first time in history that terrorists put an entire nation into

[30] Alex Lockie, "North Korea Threatens 'Nuclear Thunderbolts' As U.S. And China Finally Work Together," American Military News (April 14, 2017); Fox News, "U.S. General: North Korea 'Will' Develop Nuclear Capabilities To Hit America" (September 20, 2016) www.foxnews.com/world/2016/09/20/north-korea-says-successfully-ground-tests-new-rocket-engine.html
[31] "Massive GPS Jamming Attack By North Korea," GPSWORLD.COM May 8, 2012.
[32] "Attackers In Mexico Blow Up Nine Electrical Plants," Los Angeles Times, October 27, 2013.

blackout, and an important U.S. ally, whose government was shortly afterwards overthrown by terrorists allied to Iran.[33]

- In July 2014, according to press reports, a Russian cyber-bug called Dragonfly infected 1,000 electric power-plants in Western Europe and the United States for purposes unknown, possibly to plant logic bombs in power-plant computers to disrupt operations in the future.[34]
- On January 25, 2015, terrorists blacked-out 80 percent of the electric grid in Pakistan, a nation of 185 million people, and a nuclear weapons state.[35]
- On March 31, 2015, most of Turkey's 75 million people experienced a widespread and disruptive blackout, the NATO ally reportedly victimized by a cyber-attack from Iran.[36]
- On December 23, 2015, a Russian cyber-attack blacked-out western Ukraine.[37]
- On December 17, 2016, another Russian cyber-attack partially blacked-out Kiev, capitol of Ukraine.[38]

Cyber-thefts and sabotage have also been escalating. On June 20, 2015, the New York Times reported that, according to Obama Administration officials in a classified briefing to Congress, a cyber-attack from China that stole sensitive U.S. Government data on millions of federal employees was information warfare "on a scale we've never seen before from a traditional adversary."[39] The Guardian declared 2016 to be “The Year of the Hack” because of numerous increasingly aggressive cyber-attacks, including on October 21, 2016 “an attack on internet service provider Dyn with a distributed denial of service (DDoS) attack took down access to Netflix, Facebook, Twitter, plus The Guardian, CNN, the New York Times, the Wall Street Journal and others.”[40] On May 12, 2017, parties unknown launched a worldwide ransomware cyber-attack effecting hospitals, banks, and other institutions in 99 countries. Russia and North Korea are suspected.[41]

We as a nation are not "connecting the dots" through a profound failure of strategic imagination. Like the Allies before the Blitzkrieg of World War II, we are blind to the unprecedented existential threat that could befall our civilization—figuratively and literally, from the sky, like lightning.

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[36] "Massive Blackout Brings Turkey To A Standstill: Iran Cyber Attack?" Breitbart, March 31, 2015; "Turkey's 10-Hour Blackout Shows Threat To World Power Grids," Bloomberg, April 1, 2015.
[37] "Russian Hackers Shut Down Ukraine's Power Grid," Newsweek, January 14, 2016; Jose Paglieri, “Scary Questions in Ukraine Energy Grid Hack” CNN January 18, 2016.R. James Woolsey and Peter Vincent Pry, "Will Infrastructure Sabotage Be The Next Pearl Harbor?" National Review, January 9, 2016.
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[39] David E. Sanger, Nicole Perlroth, and Michael D. Shear, “Attack Gave Chinese Hackers Privileged Access to U.S. Systems,” New York Times June 20, 2015.
[40] Geoff Wheelwright, “How 2016 Became The Year of the Hack,” The Guardian December 21, 2016.
[41] Julia Carrie Wong and Olivia Solon, “Massive Ransom-Ware Cyber-Attack Hits Nearly 100 Countries Around The World,” The Guardian May 12, 2017.

II EMP ATTACK: BASIC FACTS AND PRINCIPLES

Electromagnetic pulse (EMP) attack is technically and operationally the easiest, least risky, and most effective use of a nuclear weapon available to a nuclear-armed state or non-state actor.

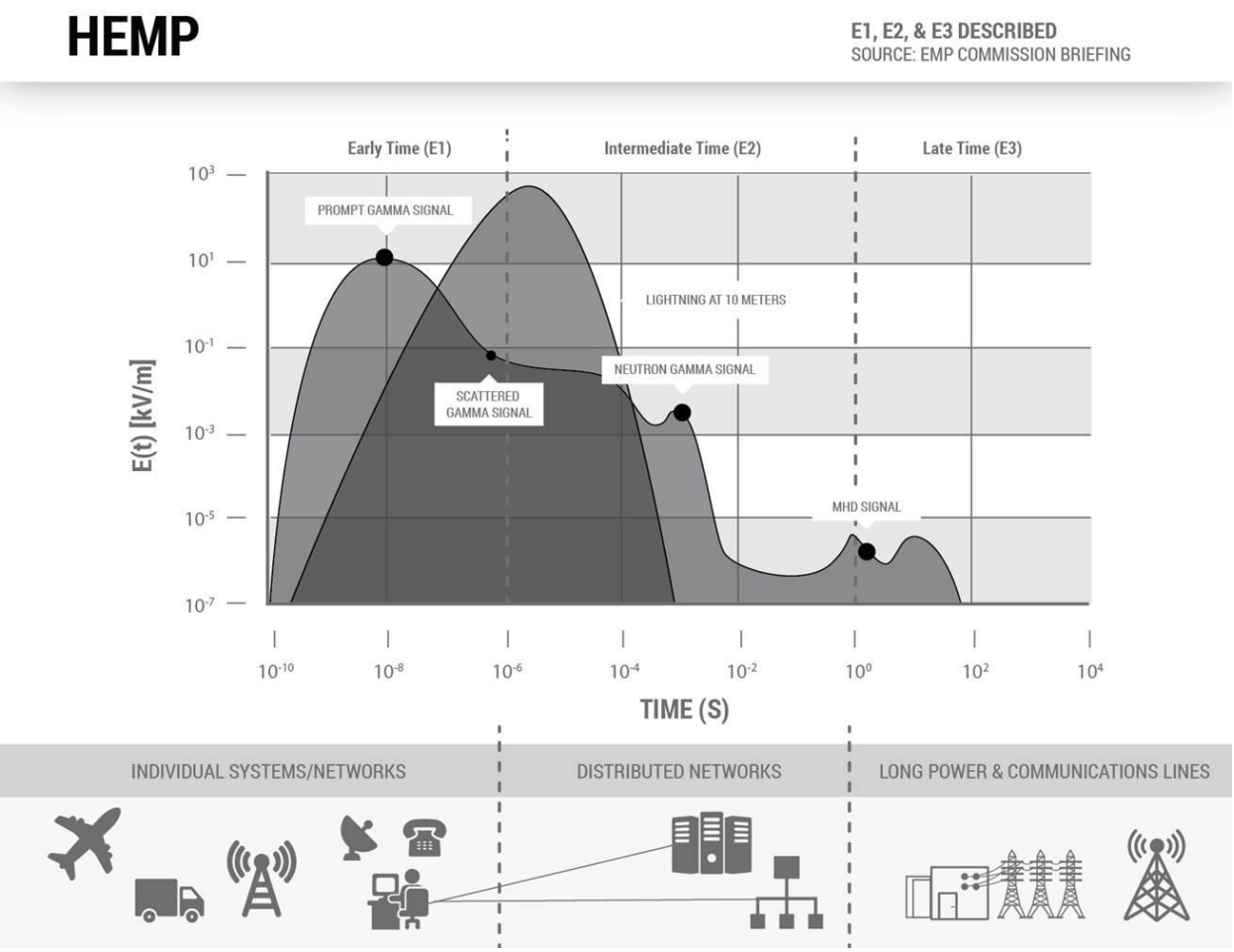
What Is EMP?

Any nuclear weapon, even a primitive first-generation weapon like the A-bombs that destroyed Hiroshima and Nagasaki, will produce gamma rays and fireballs that generate the high-frequency (E1 EMP), medium-frequency (E2 EMP), and low-frequency (E3 EMP) electromagnetic pulses. EMP attack delivers a three-fold punch to electronics small and large, ranging from personal computers to national electric grids and everything in-between:

- Nuclear EMP attack entails detonating the weapon at such high altitude that no blast, thermal, fallout or effects other than EMP are experienced on the ground.
- EMP is like "super-lightning" in that it delivers a shock much more powerful than lightning against, not a point, but against electronics over a vast area.
- A single nuclear weapon can potentially make an EMP attack against a target the size of North America.
- E1 EMP is much faster (lasting nanoseconds) and much more powerful than lightning, cannot be stopped by devices designed specifically for lightning protection, can damage and destroy small electronics and control systems necessary for the operation of everything from automobiles to airplanes, including electric grids, communications, and all other critical infrastructures.
- E2 EMP is as fast (lasting milliseconds) and as powerful as lightning and can be stopped by lightning protection, but many commercial enterprises and homes lack lightning protection.
- E3 EMP is much slower (lasting seconds) but has much more net energy than lightning, is potentially more powerful than the electromagnetic fields that could be generated by a solar super-storm, that can melt transformers designed to carry hundreds of thousands of volts.
- Because EMP propagates in three "waves" their damaging effects will be dynamic and mutually reinforcing, the E1 EMP damaging and destroying systems (including possibly lightning protection) that opens the door for wider and deeper damage by E2 and E3 EMP.

Any nuclear weapon detonated at an altitude of 30 kilometers or higher will generate a potentially catastrophic EMP. A nuclear detonation at 30 kilometers altitude will generate an EMP field with a radius on the ground of about 600 kilometers. Detonated at 400 kilometers altitude, the radius of the EMP field will be about 2,200 kilometers.[42]

[42] For the best background on nuclear EMP attack and effects see: Congressional EMP Commission, Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack: Executive Report (2004); Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack: National Critical Infrastructures (2008).

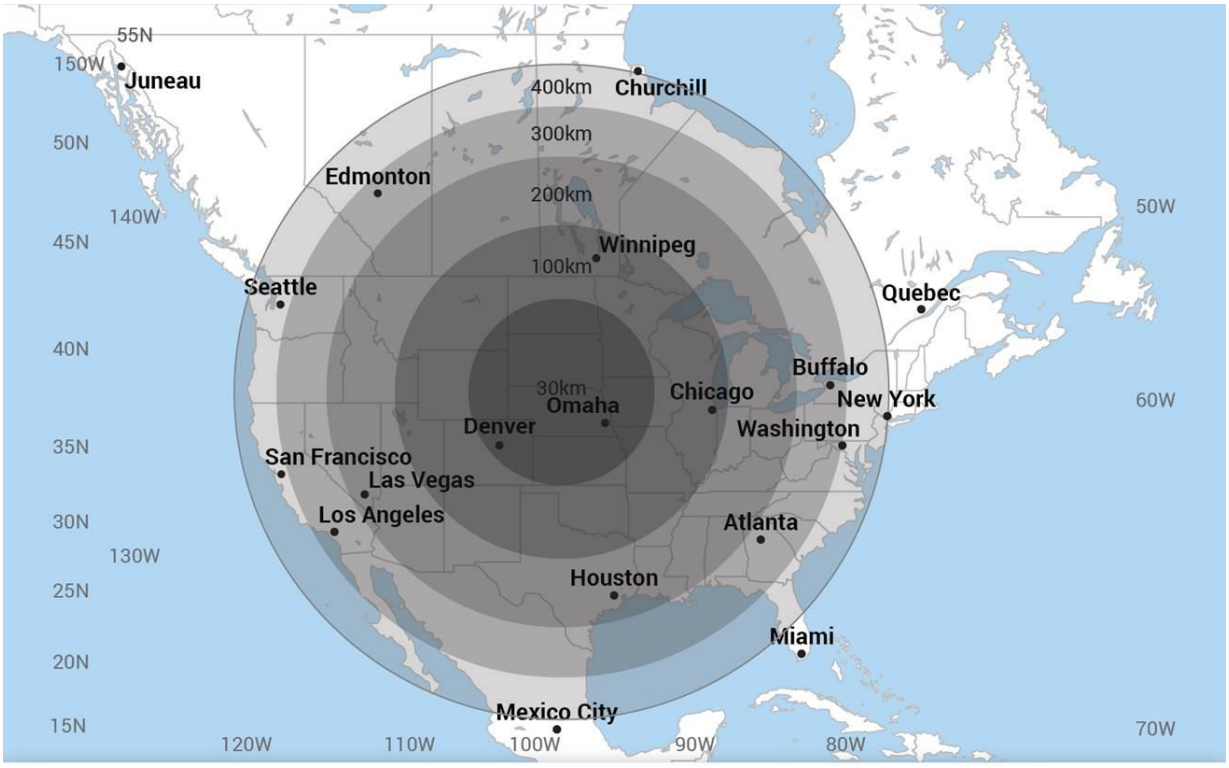


EMP Attack Is Easy

Accuracy is not necessary for an EMP attack because the target altitude (30-400 kilometers) is so wide, and the radius and the coverage of the EMP field is so vast.

EMP attack does not require a re-entry vehicle, heat shield, shock absorbers and other paraphernalia associated with a nuclear missile warhead designed for blasting a city. These are unnecessary for an EMP attack, which detonates the warhead above the atmosphere, in outer space.

EMP attack can be executed by a wide variety of delivery vehicles, anything that can loft a nuclear weapon to 30 kilometers or higher. Possible delivery vehicles against the United States include a satellite, a long-range missile, a medium- or short-range missile launched off a freighter, some kinds of cruise missiles and anti-ship missiles (like Russia's Club-K exported to Iran), a jet fighter or some kinds of jet airliner doing a zoom climb, even a meteorological balloon.



NUCLEAR HEMP AREA COVERAGE
NUCLEAR EMP ATTACK SCENARIOS

EMP field coverage increases with increasing height-of-burst. A balloon or jet aircraft could loft a nuclear warhead to an altitude of 30 kilometers which, targeted over New York City, would also cover Washington, D.C., New York State, New Jersey, Pennsylvania, Virginia, Maryland, Delaware, and most of New England.

EMP Fields and Effectiveness

The size of the EMP field on the ground is determined by the altitude of detonation, EMP propagating from the point of detonation to the horizon. The higher the altitude of detonation, the bigger the EMP field on the ground.

In general, EMP field strengths on the ground are stronger when the weapon is detonated at lower altitudes, where the effects are more concentrated within a smaller radius, and weaker when the weapon is detonated at higher altitudes, where the effects are within a larger radius and cover a bigger area. EMP effects are dangerous at all altitudes. Varying the altitude of the EMP attack can be used to adjust the size of the EMP field to better fit the target. Since the radius of the EMP field is not highly sensitive to altitude, relative to any delivery system (even the Houthis or Taliban could use commercial off-the-shelf technology to rig a fusing system that will detonate within less than one kilometer of the desired altitude) again accurate delivery is not an issue.

EMP fields are strongest at the center, where the peak field is located, and reduce in strength toward the margins. As a general rule, EMP field strength at the outer edge of the field will be about one-half of the peak field strength. Even for a primitive first-generation nuclear weapon, the entire field is dangerous, not just the peak field.

ELECTROMAGNETIC PULSE (EMP) FIELD RADIUS ON EARTH'S SURFACE FROM NUCLEAR WEAPON DETONATED AT GIVEN HEIGHT OF BURST(HOB)

(Kilometers)

HOB	EMP Radius	HOB	EMP Radius	HOB	EMP Radius
30	602*	160	1,391	290	1,873
40	696	170	1,434	300	1,905
50	778	180	1,476	310	1,937
60	852	190	1,516	320	1,968
70	920	200	1,556	330	1,998
80	984	210	1,594	340	2,028
90	1,044	220	1,632	350	2,058
100	1,100	230	1,668	360	2,087
110	1,153	240	1,704	370	2,116
120	1,205	250	1,739	380	2,144
130	1,254	260	1,774	390	2,172
140	1,301	270	1,807	400	2,200**
150	1,347	280	1,841		

Calculated from Radius = 110 ($\sqrt{}$HOB) in kilometers

* Radius exceeds distance from New York to Washington

** Radius covers all of continental United States

Damage to electric grids and other critical infrastructures are not be limited to the EMP field. Cascading failures will propagate far beyond the EMP field through an unprotected electric grid, assuming the EMP field is smaller than the electric grid being attacked.

For example, a 10 kiloton weapon detonated at 30 kilometers over the U.S. Eastern Grid would generate an EMP field about 600 kilometers in radius, much smaller than the Eastern Grid. But the national electric grid being aged, over-taxed with demand, always operating on the verge of failure, capable of blackouts that put 50 million people into the dark because of cascading failures from a tree branch (like the Great Northeast Blackout of 2003), the entire Eastern Grid would certainly be plunged into a protracted blackout from such an EMP attack. The U.S. cannot survive without the Eastern Grid which generates 75 percent of the nation's electricity and supports most of the national population.

Any Nuke Will Do

For nuclear weapons of normal design, a high-yield weapon will generate a more powerful EMP field than a low-yield weapon, but the difference in field strength is not nearly as great as the difference in yield. For example, a 1,000 kiloton nuclear weapon will not generate an EMP field 100 times greater than a 10 kiloton nuclear weapon. Indeed, a 10 kiloton weapon will generate an E3 EMP field nearly as powerful as the 1,000 kiloton weapon, but over a smaller area.

Even a primitive first-generation nuclear weapon such as terrorists might build, like the first nuclear weapon ever built, the 10 kiloton bomb that destroyed Hiroshima, detonated at 30 kilometers altitude, will generate an EMP field that at the weakest, on the margins, will be several thousand volts per meter. This is enough to put at risk all unprotected civilian and military systems within the field.

Worldwide, most civilian electronic systems, and most military general purpose forces—including those of the United States—are not hardened against EMP. According to the Congressional EMP Commission *Executive Report* (2004):

> *"The end of the Cold War relaxed the discipline for achieving EMP survivability within the Department of Defense, and gave rise to the perception that an erosion of EMP survivability of military forces was an acceptable risk. EMP simulation and test facilities have been mothballed or dismantled, and research concerning EMP phenomena, hardening design, testing, and maintenance has been substantially decreased. However, the emerging threat environment, characterized by a wide spectrum of actors that include near-peers, established nuclear powers, rogue nations, sub-national groups, and terrorist organizations that either now have access to nuclear weapons and ballistic missiles or may have such access over the next 15 years have combined to place the risk of EMP attack and adverse consequences on the US to a level that is not acceptable."*

Military planners correctly assume, and civilian emergency managers and engineers should assume, that electronic systems not protected against EMP are vulnerable.

Super-EMP Weapons

"Super-EMP" weapons, as they are termed by Russia, are nuclear weapons specially designed to generate an extraordinarily powerful E1 EMP field. Super-EMP warheads are designed to produce gamma rays, which generate the E1 EMP effect, not a big explosion, and typically have very low explosive yields, only 1-10 kilotons. According to Russian open sources, a Super-EMP weapon can generate a peak E1 EMP field of 200,000 volts per meter, which would be 100,000 volts/meter at the margins. Even EMP hardened U.S. strategic forces and command, control, communications and intelligence (C3I) systems are potentially vulnerable to such a threat.[43]

The Congressional EMP Commission warns that Russia, China, and probably North Korea have Super-EMP warheads. Moreover, according to the EMP Commission *Executive Report* (2004):

[43] "Russia: Nuclear Response To America Is Possible Using Super-EMP Factor", Aleksey Vaschenko, "A Nuclear Response To America Is Possible," Zavtra, November 1, 2006.

"Certain types of low-yield nuclear weapons can be employed to generate potentially catastrophic EMP effects over wide geographic areas, and designs for variants of such weapons may have been illicitly trafficked for a quarter-century."

The U.S. has no Super-EMP weapons in its nuclear deterrent.

Questions and Answers to Common Myths and Misconceptions

Why would a military planner use EMP attack when its exact effects on any specific target, like a particular extra high-voltage (EHV) transformer or an individual computer, are highly unpredictable? Although it is very difficult to predict exactly which electronic systems would be upset, damaged, or destroyed by an EMP attack, with certainty massive disruption and damage will be inflicted on unprotected electronics within the EMP field and, because of cascading failures, far beyond. EMP is analogous to carpet bombing or an artillery barrage that causes massive random damage that is specifically difficult to predict, but reliably catastrophic in its macro-effects.

Cyber-attacks and physical sabotage against electric grids would rely far more heavily than EMP on highly unpredictable cascading failures resulting from random damage to cause a protracted blackout. Yet cyber threats and sabotage despite their randomness of effect, unlike EMP, are deservedly top priorities for DHS and the electric power industry.

EMP should be a top priority threat for DHS and industry too, but currently is not.

Are the effects of EMP attack merely theoretical? No. The empirical basis for the threat of an EMP attack to electric grids and other critical infrastructures is far deeper and broader than the data for cyber-attacks or sabotage. The notion that a cyber-attack or sabotage can plunge the U.S. into a protracted blackout—while very real threats that warrant deep concern—are far more theoretical constructs than EMP attack.

We know for certain that EMP will cause widespread damage of electronics and protracted blackout of unprotected electric grids and other critical infrastructures from such hard data as:

- The U.S. STARFISH PRIME high-altitude nuclear test in 1962 over Johnston Island that generated an EMP field over the Hawaiian Islands, over 1,300 kilometers away, causing widespread damage to electronic systems.[44]
- Six Russian EMP tests 1961-1962 over Kazakhstan, an area larger than Western Europe, that proved a single weapon can cause widespread destruction of the electric grid.[45]
- 30 years (1962-1992) of U.S. underground nuclear testing that included collecting data on EMP effects.

[44] Phil Plait, "The 50th Anniversary of Starfish Prime: The Nuke That Shook The World" Discover, July 9, 2012.
[45] Jerry Emanuelson, "Soviet Test 184: The 1962 Soviet Nuclear EMP Tests Over Kazakhstan" Future Science, Undated; Vladimir M. Loborev, "Up to Date State of the Nuclear EMP Problems and Topical Research Directions" Electromagnetic Environments and Consequences: Proceedings of the European International Symposium on Electromagnetic Environments, EUROEM Conference, Bordeaux, France, 1994; V. N. Mikhailov, *The Nuclear Tests of the USSR*, Vol. 2, Institute of Strategic Stability, Rosatom.

- Over 50 years of testing by EMP simulators, still ongoing, including by the Congressional EMP Commission (2001-2008) that proved modern electronics are over 1 million times more vulnerable to EMP than the electronics of 1962.[46]

Moreover, hard data proving the threat from nuclear EMP is available from natural EMP generated by geomagnetic storms, accidental damage caused by electromagnetic transients, and non-nuclear radiofrequency weapons (RF weapons). All of these produce field strengths much less powerful than nuclear EMP, and in the case of accidental electromagnetic transients and radiofrequency weapons, much more localized. There are many thousands of such cases.

Many documented examples of successful attacks using RF weapons, and accidents involving electromagnetic transients, are described in the Department of Defense *Pocket Guide for Security Procedures and Protocols for Mitigating Radio Frequency Threats* (Technical Support Working Group, Directed Energy Technical Office, Dahlgren Naval Surface Warfare Center). A few examples:

- "Radio Frequency Weapons were used in separate incidents against the U.S. Embassy in Moscow to falsely set off alarms and to induce a fire in a sensitive area."

- "In Kzlyar, Dagestan, Russia, Chechen rebel commander Salman Raduyev disabled police radio communications using RF transmitters during a raid."

- "In June 1999 in Bellingham, Washington, RF energy from a radar induced a malfunction in a supervisory control and data acquisition (SCADA) system that caused a gas pipeline to rupture and explode."

- "In 1999, a Robinson R-44 news helicopter nearly crashed when it flew by a high-frequency broadcast antenna."

- North Korea used a radio frequency weapon, purchased from Russia, to attack airliners and impose an "electromagnetic blockade" on air traffic to Seoul, South Korea's capital. The repeated attacks also disrupted communications and the operation of automobiles in several South Korean cities in December 2010; March 9, 2011; and April-May 2012.[47]

Instead of nuclear EMP attack, why not rely on cyber-attack and physical sabotage to blackout the electric grid and other critical infrastructures? As explained above, compared to EMP attack, cyber-attack and sabotage are unproven and problematical as means to effect a protracted nationwide blackout, especially against a nation like the United States that has 3,000 different electric utilities using a wide array of different hardware and software. Such technological diversity poses a significant and perhaps insurmountable challenge to cyber-attack and sabotage, but not to EMP attack. Anything that is not hardened against EMP is potentially vulnerable.

[46] "Electromagnetic Pulse: Threat to Critical Infrastructures" Hearing before the Subcommittee on Cybersecurity, Infrastructure Protection, and Security Technologies, House Committee on Homeland Security, Washington, D.C.: May 8, 2014.
[47] "Massive GPS Jamming Attack By North Korea" GPSWORLD.COM, May 8, 2012.

To be sure, cyber-attack and sabotage are serious threats even to the U.S. national electric grid. Admiral Michael Rogers, Chief of U.S. Cyber Command and Director of the National Security Agency, on November 20, 2014, warned the House Permanent Select Committee on Intelligence that sophisticated great powers like China and Russia have the capability to blackout the entire U.S. national electric grid for months or years by means of cyber-attack, according to press reports. Sabotage using rifles or explosives, reportedly according to a sensitive study by the U.S. Federal Energy Regulatory Commission, could cause a protracted nationwide blackout from an attack on just 9 of 2,000 EHV transformer substations.[48]

However, these threat assessments of cyber and sabotage are largely theoretical, based on computer modeling, not on demonstrated capabilities and a vast body of empirical evidence as is the case with EMP. Some cyber experts like Thomas Rid (*Cyber War Will Not Take Place* Oxford University Press, 2013), Bruce Schneier, Peter Singer, and Ronald Delbert (*Black Code: Inside The Battle For Cyberspace*) argue that, in Schneier's words, "The threat of cyber war has been hugely hyped." Cyber experts such as these doubt cyber-attacks can blackout the national grid.[49]

Sabotage by terrorists have caused nationwide or large-scale blackouts of the grid in Mexico (2013), Yemen (2014), and Pakistan (2015)—but these were temporary, not protracted, blackouts. And the electric grids in these nations are rudimentary and managed by a single utility.

Western Ukraine was blacked-out on December 23, 2015 and part of Kiev in 2016 allegedly by a Russian cyber-attack. Turkey may have been blacked-out by a cyber-attack from Iran in 2015. These are the only known cases of cyber blackout. The grids in Western Ukraine and Turkey are managed by a single utility. The blackouts were temporary, not protracted.

During the Gaza War between Israel and Hamas in 2014, a major cyber campaign using computer bugs and hacking was launched against Israel and its electric grid by Hamas, the Syrian Electronic Army, Iran, and by sympathetic hackers worldwide. The Gaza War was a cyber world war against Israel. Hamas also attempted to blackout the Israeli electric grid by missile strikes and sabotage. According to the Institute for National Security Studies at Tel Aviv University, in "The Iranian Cyber Offensive During Operation Protective Edge" all of these combined cyber and sabotage efforts failed to blackout Israel's well-protected grid.

However, Israel's electric grid is not yet protected against EMP attack.

A prudent military planner prosecuting a Blackout War against the United States or its allies would not likely gamble victory or defeat on cyber and sabotage operations alone, if he has the capability to make an EMP attack. EMP is the "big stick" and "ace in the hole" and is rightly regarded by Russia, China, North Korea, and Iran as "the ultimate cyber weapon."

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[48] Admiral Rogers testified a cyber blackout "is not a question of if, but when?" see: "The U.S. Government Thinks China Could Take Down The Power Grid" CNN, November 21, 2014; on the FERC report citing nationwide blackout by sabotage see: "U.S. Risks National Blackout From Small-Scale Attack" Wall Street Journal, March 12, 2014; Rebecca Smith, "How America Could Go Dark" Wall Street Journal, July 14, 2016.

[49] Peter W. Singer and Allan Friedman, *Cybersecurity and Cyberwarfare*, Oxford University Press, 2014.

Even those cyber warriors and commandos who may insist cyber and sabotage operations are just as great a threat to electric grids as EMP cannot deny that the historically proven efficacy of combined-arms operations argues for including EMP attack. Military history and common sense suggests that a threefold attack—using cyber, sabotage, and EMP—will be better than an attack using just one of these.

Indeed, Lanchester's Square Law, a long-established war-gaming tool familiar to military theorists of all nations, can be used as a heuristic device to demonstrate the above point mathematically. Lanchester's Square Law—proven by calculations, war-gaming, and actual warfare since before World War I—is that the advantages of increasing firepower are not merely additive, but multiplicative. So if the value of cyber-attack =1 and the value of sabotage = 1, then their net firepower value is not merely 2 but the square of two = 4. Doubling firepower results in a fourfold advantage.

Thus, if the value of cyber-attack = 1 and the value of sabotage = 1 and the value of EMP attack = 1, then their net firepower is 3 squared = 9. Even if one assumes EMP attack is no better than cyber or sabotage, its inclusion more than doubles the effectiveness of a combined arms attack.

More realistically, since EMP brings far more firepower to bear than cyber or sabotage, the equation should look more like cyber =1, sabotage =1, EMP = 3, for net firepower of 5 squared = 25. In this case, inclusion of EMP attack would increase attack effectiveness by more than sixfold.

Why won't the threat of U.S. nuclear retaliation assuredly deter a nuclear EMP attack, just as the USSR was deterred from nuclear aggression throughout the Cold War? Deterrence depends on knowing who launched the EMP attack so they can be punished by retaliation. But an EMP attack can be delivered anonymously. Launched off a freighter, a submarine, by jet, or by satellite (hundreds of satellites are in low Earth orbit), the perpetrator of an EMP attack might never be identified.

EMP attack can destroy radars, satellites and their downlinks and other national technical means necessary to identify the attacker. Bomb debris from a weapon detonated at high-altitude for EMP attack is not collectible, unlike debris from a nuclear weapon detonated in a city, so forensic analysis cannot identify the perpetrator. EMP attack leaves no fingerprints.

EMP attack, especially from a Super-EMP weapon, might paralyze strategic forces and C3I (Command, Control, Communications and Intelligence), making retaliation impossible. In the aftermath of a nuclear EMP attack that threatens the survival of millions of Americans, it seems likely that any president would order the U.S. military to give highest priority to helping the Department of Homeland Security rescue the nation, instead of prosecuting a war.

Instead of EMP attack, why not just blast a city? A nation or terrorist group having only one or a few nuclear weapons would not necessarily calculate that, instead of making an EMP attack, it is technically and operationally less risky and likely to produce a bigger payoff by blasting a city.

Missile delivery of a nuclear warhead to blast a city requires an accurate guidance system, a reentry vehicle to penetrate the atmosphere and protect the physics package from the shock and heat of re-entry, and a fusing system capable of surviving re-entry and detonating the warhead at

low-altitude or on impact. All of these requirements add significant technological and operational risk, compared to an EMP attack.

Moreover, blasting a North American city by missile would require penetrating U.S. national missile defenses (NMD)—no mean feat for one or a few primitive nuclear missiles, the very kind of threat NMD is designed to intercept. For an EMP attack, the warhead can be rigged to "salvage fuse" so it will detonate if intercepted, thereby still successfully delivering an EMP.

Smuggling a nuclear weapon into a city by ship or truck would be riskier than an EMP attack. As soon as the weapon enters U.S. waters or territory, risks escalate dramatically that the operation may be detected by the coast guard or police or by sensors now deployed in harbors and metropolitan areas to detect nuclear threats.

What if the bomb smuggling operation is penetrated by the CIA or the Federal Bureau of Investigation (FBI), and they are waiting to seize the weapon as soon as it crosses into U.S. territory? What if a member of the smuggling team decides to betray the operation and sell the bomb to the CIA or FBI? What if something breaks on the bomb when it is stowed in the hold of a ship, or when off-loaded from a freighter at sea, motor boated through choppy surf to shore, hauled up a beach, driven over bumpy roads by truck? Would the smuggling team, necessarily a small group, have the expertise necessary to make repairs, or would they be stuck inside U.S. territory with an inert nuclear bomb?

The worst possible outcome for a rogue state or terrorists would be for the U.S. to capture their nuclear weapon. Trying to smuggle a bomb into a U.S. city maximizes that risk.

And if a hostile nation succeeds in blasting a U.S. city, what have they accomplished but their own doom? A 10 kiloton weapon detonated in a city might kill and injure 300,000 through blast, thermal, and radiation effects, but the United States will not be destroyed, and the demand for revenge will be immediate and overwhelming.[50] Blasting a city is the ideal scenario for forensic analysis of bomb debris, and virtually guarantees that the U.S. can identify the culprit for annihilation.

In contrast, what could be accomplished by nuclear EMP attack?

An EMP attack could be made by satellite or launched from a ship outside U.S. territory. Shipboard there could be plenty of technicians to ensure nothing goes wrong, and plenty of security to ensure the operation is not betrayed.

A high-altitude nuclear EMP attack, because the weapon detonates in outer space, leaves no collectible bomb debris. No fingerprints. EMP attack might be executed anonymously, to escape retaliation.

The consequences of an EMP attack would be catastrophic and debilitating upon the United States, crippling U.S. military power projection capabilities and endangering national existence. According to the Congressional EMP Commission *Executive Report* (2004):

[50] Alex Wellerstein's NUKEMAP model calculates a 10 kiloton weapon ground-burst in New York City, on Manhattan, would kill 103,000 and injure 213,430.

"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 U.S. society, as well as to the ability of the United States and Western nations to project influence and military power….The recovery of any one of the key national infrastructures is dependent on the recovery of others. The longer the outage, the more problematic and uncertain recovery will be. It is possible for the functional outages to become mutually reinforcing until at some point the degradation of infrastructure could have irreversible effects on the country's ability to support its population."

The Congressional EMP Commission estimates that an EMP attack causing a protracted nationwide blackout lasting one year could kill up to 90 percent of the American people through starvation and societal collapse.[51]

During the height of the Cold War, close upon the 1962 Cuban missile crisis when nuclear conflict with the USSR was a very real possibility, then Defense Secretary Robert McNamara estimated the Soviet Union could be deterred if U.S. nuclear retaliation could kill 25 percent of the Soviet population and destroy 75 percent of the USSR's industry. McNamara calculated this "Assured Destruction" of the USSR would require delivering 400 "equivalent megatons"—a force equivalent to hundreds or thousands of nuclear weapons.

Yet a nuclear rogue state or terrorists could by EMP attack threaten or deliver upon the United States catastrophic destruction greater than McNamara's "Assured Destruction"—and do so employing just one or a few nuclear weapons. The Congressional EMP Commission warns (*Executive Report* 2004):

"Therefore, terrorists or state actors that possess relatively unsophisticated missiles armed with nuclear weapons may well calculate that, instead of destroying a city or military base, they may obtain the greatest political-military utility from one or a few such weapons by using them—or threatening their use—in an EMP attack. The current vulnerability of U.S. critical infrastructures can both invite and reward attack if not corrected..."

EMP attack is the only realistic scenario where a rogue state or terrorists having one or a few nuclear weapons could prevail by annihilating the U.S., or by credibly threatening Assured Destruction of the United States.

What about the international taboo against nuclear warfare? Russia, China, North Korea, and Iran in their military doctrines and training regard EMP attack as part of all-out cyber warfare or radio-electronic warfare, not necessarily as nuclear warfare. China in military writings and exercises, despite its nuclear No First Use pledge, employs EMP attacks, even though there is no evidence of U.S. nuclear first use.[52]

[51]Staff Paper, Congressional EMP Commission Examples From Testimony And Reports That Fatalities Could Be High Numbering Millions And 90 Percent Of Population, EMP Task Force On National And Homeland Security.
[52] Dr. Peter Vincent Pry, "Foreign Views of Electromagnetic Pulse (EMP) Attack" Testimony before the U.S. Senate Subcommittee on Terrorism, Technology and Homeland Security, March 9, 2005.

Even some analysts in Germany and Japan, among the most anti-nuclear nations, because EMP destroys electronics instead of blasting cities, is regarded by them as acceptable use of a nuclear weapon.[53]

EMP attack would be perfect for implementing Russia's strategy of "de-escalation"—that appears to have been adopted by China and North Korea—where a conflict with the U.S. and its allies would be won by limited nuclear use, their version of "shock and awe" to cow the U.S. into submission.[54] An EMP attack would be the most militarily effective use of one or a few nuclear weapons, while also being the most acceptable nuclear option in world opinion, the option most likely to be construed in the U.S. and internationally as "restrained" and a "warning shot."

In the West, generations of leaders and citizens have been educated that use of nuclear weapons is "unthinkable" and the ultimate horror. Not so in Russia, China, and North Korea where their nuclear capabilities are publicly paraded, missile launches and exercises are televised as a show of strength, an important part of national pride. Whereas the U.S. nuclear deterrent is kept low-profile, almost invisible, and its utility and legitimacy much debated, Russia and China run television documentaries describing how they would win a nuclear war with the United States.[55]

The "international taboo" on nuclear warfare is one-sided and far more likely to have a psychologically paralyzing effect on the U.S., NATO and their allies than on Russia, China, North Korea, or Iran. An EMP attack or demonstration made to "de-escalate" a crisis or conflict could raise a chorus of voices in the West against nuclear escalation and send some Western leaders in a panicked search for the first "off ramp."

Some analysts think the world is on the threshold of a "new nuclear age" where Cold War rules and assumptions about deterrence no longer apply and the likelihood of nuclear use is greatly increasing.[56] The first nation to use nuclear weapons today—even a rogue state like North Korea or Iran—will immediately become the most feared and most credible nuclear power in the world, a formidable force to be reckoned with, and perhaps the dominant actor in a new world order.

[53] See for example Sun Tzu-Yun in Jadi June 1, 2000, and Wolfgang Haas in "Infowarfare and the Military Strategy of the Bundeswehr," Telepolis November 3, 1998.
[54] Dr. Mark Schneider, *The Nuclear Forces And Doctrine Of The Russian Federation* Nation Institute Press for United States Nuclear Strategy Forum, 2006.
[55] "LIGNET: Why China Televised 'Nuclear War' Against The U.S." Newsmax, November 21, 2013.
[56] Paul Bracken, *The Second Nuclear* Age, Macmillan 2013.

III SCENARIOS FOR NUCLEAR EMP ATTACK AND COMBINED-ARMS CYBER WARFARE

Imperial Japan attacked the U.S. Pacific Fleet at Pearl Harbor on December 7, 1941, because Japanese military planners correctly assumed the U.S. Navy and Army would be at their least vigilant, most vulnerable psychologically and in military posture to surprise attack, on a Sunday. The EMP scenarios that follow hypothesize that the attacks take place in the near future, sometime during the first term of President Trump's new administration. For any new President, especially the first years of their new administration—while some 4,000 new officials are being appointed or hired to run the new government, while new policies are being debated and formulated, while U.S. allies adjust to new U.S. leadership—the first term is a period of transition and discontinuity that constitutes, in effect, a long Sunday.

Enemies planning to attack the United States or its allies could find few better times than when the nation is transitioning to a new Commander-in-Chief and new administration and is most divided politically from top to bottom. The long period for transitioning from one presidential administration to the next, regardless of party, is an inevitable consequence of being a constitutional republic and also of traditions rooted in the agrarian past, long before the nuclear missile age—and before anyone could conceive that EMP and cyber surprise attacks could happen at the speed of light.

For example, Inauguration Day originally fell on March 4, four months after Election Day, as everything, including transitioning to a new presidential administration, moved at the pace of horse and buggy. In 1933, the 20th Amendment moved Inauguration Day to January 20—74 days after Election Day—reflecting the faster pace of life introduced by the automobile and radio. But Inauguration Day only continues the long period of transition from one government to another as new personnel and new policies arrive—a process taking many months or years, typically a preoccupation during the first term of any new President.

Hostile military planners could have a treasure trove of reasons for launching a surprise attack against the U.S. or its allies during "the long Sunday" that is the first term of any new President. Hostile foreign intelligence officers, from their analysis of all sources, might well conclude the following:

- For the first time in 8 years, the United States is undergoing a long transition to a new Commander-in-Chief and new administration, while for months or years the outgoing administration remains temporarily in office as "lame ducks" or by permanently burrowing into the federal bureaucracy, perhaps to act maliciously as the disloyal opposition.

- Disruption of national leadership, a top military goal, will be occurring naturally because of the transition to a new president and new administration.

- A surprise attack on the U.S. or its allies will test and very likely strain alliance relationships with a new President and new administration as both will be less familiar or unknown to friends and foes.

- Because American politics has become a zero-sum game of winners and losers, after one of the most divisive elections in U.S. history, many Americans may remain deeply divided, and may not rally behind the new Commander-in-Chief to defend a U.S. ally or even the U.S. homeland. Indeed, half the country may blame the other half, blame the previous President or the new President, for an attack on the United States or its allies, regardless of the facts and the necessity of unity.
- Every year from Thanksgiving (the fourth Thursday in November) through Christmas to New Year's Day holidays ending on January 2, is another recurring “long Sunday" lasting 41 days. Official Washington from top to bottom, including in Congress, the Department of Defense, and the Intelligence Community, is mostly on holiday and many are physically absent. Among those who remain many or most are psychologically absent and at their least vigilant.
- Plans to strengthen U.S. conventional forces, modernize nuclear forces, and protect national critical infrastructures from EMP and cyber threats have been proposed, but not yet implemented. Better to strike when U.S. strength and preparedness are at their nadir.

EMP Scenarios

The unclassified scenarios that follow postulate an enemy combined-arms operation employing cyber, sabotage, and nuclear EMP attack against U.S. allies and the United States itself. Details of cyber and sabotage operations are not described to avoid classification issues, but are assumed occurring within the territories of the victim nation or nations, within the limits circumscribed by the EMP field.

These unclassified EMP scenarios in most cases do not detail the technical characteristics of the nuclear weapon employed or the EMP field strengths to avoid classification issues. Such technical details are unnecessary for the purpose of exploring how potential adversaries may think about using a nuclear EMP attack to achieve their geopolitical goals. And virtually any nuclear weapon, including a primitive 10 kiloton weapon like the atomic bomb that destroyed Hiroshima, if detonated at 30 kilometers altitude or higher, would damage electric grids, blackout other critical infrastructures, and put at risk unprotected civilian and military assets within the EMP field.

EMP specialists may prefer that the scenarios always use the “optimum height-of-burst (HOB)” to maximize EMP field strength. But political, strategic, and ideological calculations often override the preferences of technical experts in planning and fighting wars historically and today, whether it is the medieval prohibition of using crossbows against Christians or HOBs for nuclear airbursts in the U.S. Single Integrated Operational Plan (SIOP) to minimize collateral damage. The HOBs for nuclear EMP attack in the scenarios here are “optimal” from the political, strategic, and ideological perspective of the postulated adversary, in the context of the postulated circumstances.

Scenarios that follow are not exhaustive. Many other possibilities are plausible. Nor are all scenarios equally plausible. Some are more likely than others. The scenarios are meant to introduce the reader to how potential adversaries might think about using EMP attack to advance vital geopolitical interests, to illustrate the broad range of possibilities, and warn about what may be impending in our increasingly chaotic, crisis prone, and dangerous world.

IV THE MIDDLE EAST

Iran is generally regarded as the most likely nuclear aggressor in the Middle East. The scenarios below assume Iran already has nuclear weapons. The mainstream view is that Iran does not yet have nuclear weapons, but a minority of many U.S. and Israeli experts disagree.

For example, an article co-authored by several senior Reagan Administration national security officials warns:

> *"Regardless of intelligence uncertainties and unknowns about Iran's nuclear weapons and missile programs, we know enough now to make a prudent judgment that Iran should be regarded by national security decision makers as a nuclear missile state capable of posing an existential threat to the United States and its allies....The fact of Iran's ICBM capability and their proximity to nuclear weapons necessitates that Iran be regarded as a nuclear missile state—right now."*[57]

Authors of the assessment that Iran already has nuclear-armed missiles include Dr. William Graham (Former Science Advisor to President Reagan, director of NASA, and Chairman of the Congressional EMP Commission), Fritz Ermarth (former Chairman of the National Intelligence Council), and Ambassador Henry Cooper (former Director of the Strategic Defense Initiative). Ambassador R. James Woolsey (former Director of Central Intelligence) endorses the article and has published similar views.

In an interview, retired General Paul Vallely said Iran already has nuclear weapons, and that "decades of intelligence" shows Russia, China and North Korea helped:

> *"Iran already has a nuclear weapon, making the nuclear deal 'a moot point' retired U.S. Army Gen. Paul Vallely told Newsmax TV...Decades of intelligence reports show that Teheran has 'gotten support from Russia, from North Korea and from China,' Vallely told...host J.D. Hayworth. 'It's a cabal that's been set up to support the Iranian nuclear program. They have the launch systems. They have the guidance-control system. They have the detonation system. They have the warhead. And guess what? Russia and North Korea's tested everything for them. All they have to do is put it together like a tinker toy—and that's why they have the nuclear capability now,' Vallely said."*[58]

For a more detailed analysis of the evidence that Iran already has nuclear weapons see "Iran—The Worst Deal" (Family Security Matters, October 3, 2015) that says in summary:

> *"Obama's nuclear deal with Iran is the worst deal possible because Iran probably already has the bomb. All 10 nuclear weapon states developed A-Bombs in 3-12 years, while Iran has been crashing on the bomb for 30 years. Nuclear testing to develop A-Bombs and even more sophisticated H-Bombs is unnecessary as component testing is sufficient. After getting the A-Bomb, timeline for H-Bomb development is 3-8 years, so Iran has been working long enough for more*

[57] "EXPERTS: Iran Now A Nuclear-Ready State, Missiles Capable of Hitting U.S." Newsmax, February 1, 2015.
[58] "Gen. Paul Vallely: Iran Already Has Nukes, Making Deal 'Moot'" Newsmax, August 27, 2015.

sophisticated nuclear weapons. Russia and North Korea are helping Iran, potentially accelerating Iran's developmental timeline for nuclear weapons and long-range missiles. Although the IAEA [International Atomic Energy Agency] is too timorous to say so, evidence in the IAEA's 2011 report is a 'smoking gun' that Iran does have a nuclear weapons program—and probably nuclear weapons."

Even the former Obama Administration, which insisted Iran does not yet have nuclear weapons, assessed that Tehran was within one year or less of developing the bomb. The purpose of the Joint Comprehensive Plan of Action (JCPOA) concluded with Iran on July 14, 2015 "is to bring to a minimum of one year, for at least 10 years, the 'breakout time', or the time Iran needs to produce enough fissile material to make an atom bomb."[59]

Iran in public statements and writings by senior political and military officials has declared as perhaps its most important foreign policy objective the destruction of Israel. Iran is actively trying to achieve the destruction of Israel through supporting international terrorist organizations like Hamas, Hezbollah and many others, and states hostile to Israel, like Syria.

Geostrategically, Iran calculates that the destruction of Israel would make Iran the leader of the Muslim world, as both Shiite and Sunni Muslim factions are united in their universal hatred of Israel, and so position Iran to re-establish and lead a Caliphate dominating the Middle East. Ideologically, the Mullahs leading Iran's theocracy believe as a matter of religious conviction that destruction of Israel is necessary to bring about the Shiite version of Apocalypse where Islam triumphs in the temporal and spiritual universe by the return of the 12th Imam who will rule the world from Jerusalem.

Iran Strikes Israel

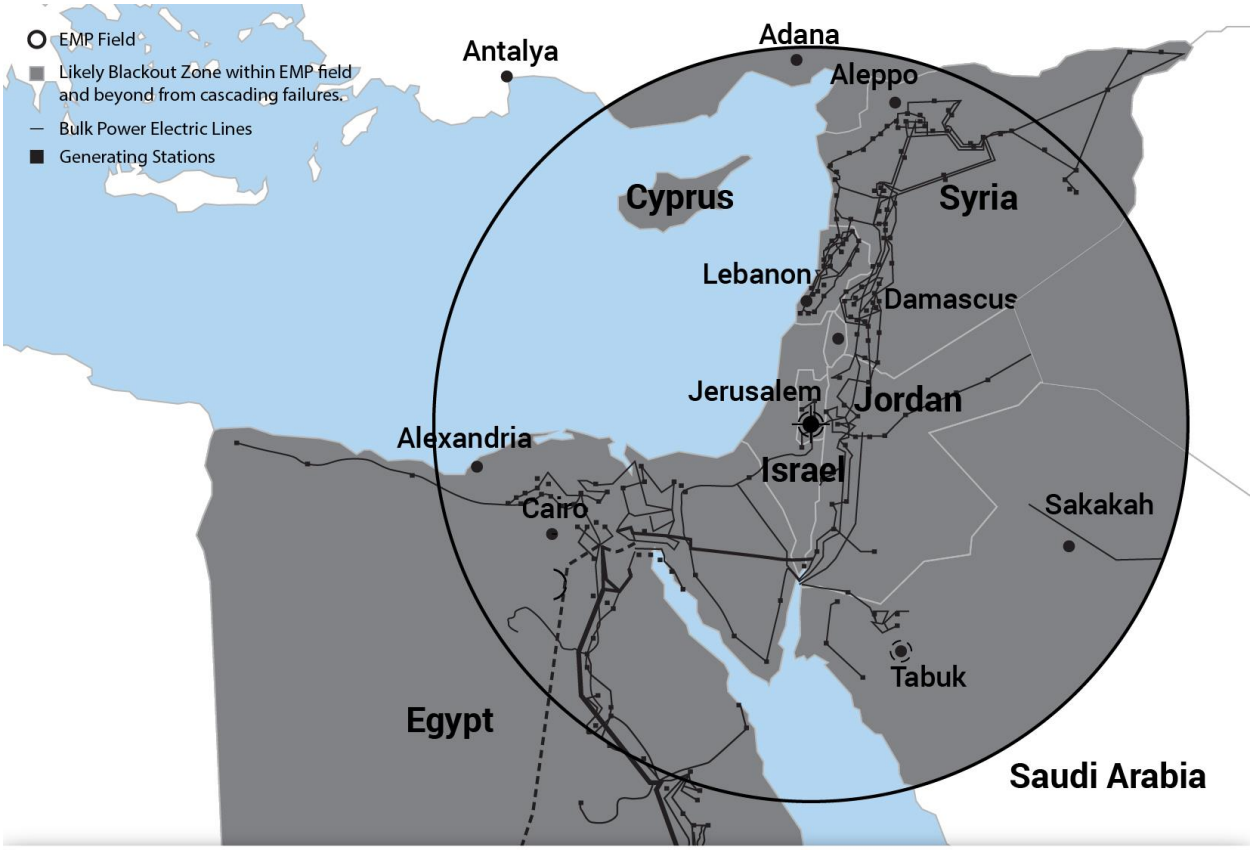
In this scenario, Iran centers an EMP attack on Jerusalem to destroy Israel and facilitate the conquest of its territory and the Holy City. Unlike a nuclear air- or ground-burst, which would destroy Jerusalem, an EMP attack will enable capture of the Holy City intact.

A nuclear weapon is detonated at 30 kilometers HOB over Jerusalem. Radius of the EMP field extends outward from Jerusalem to a distance of 600 kilometers.

The EMP field covers all of Israel, all of Jordan, and all of Lebanon (Israel is mostly under the peak EMP field where effects are strongest). The EMP field covers the most populous part of Egypt, extending as far as the capitol at Cairo and Alexandria; half of Syria; and northern Saudi Arabia, covering the cities of Tabuk and Sakakah. All of Syria is likely to experience protracted blackouts due to cascading grid failures triggered by the EMP.

Northern Saudi Arabia would be blacked-out due to the EMP, but perhaps not the entire country, because the cities of Tabuk and Sakakah (also called Al Jawf) appear currently to be on a local grid that is unconnected to the national grid. Tabuk hosts one of Saudi Arabia's largest air force bases. Tabuk and Sakakah and the surrounding region under the EMP field with its nearly one million inhabitants and over 16,000 farms is one of the few agricultural lands in the otherwise desert Kingdom of Saudi Arabia. Blackout of this region and its airbase within range of

59 "The Iran Nuclear Deal" AFP July 13, 2017.



supporting Israel would be regarded as a bonus "warning shot" by Shiite Iran, that regards Sunni Saudi Arabia as a hated apostate and ally of the United States. If Tabuk and Sakakah are ever connected to the national grid, an EMP field here would likely cause cascading failures that would blackout all of Saudi Arabia, an even bigger bonus.

The EMP field covers a small part of Western Iraq, but no cities, and would not likely blackout Iraq—where are located powerful forces (100,000 troops) of the Iranian Revolutionary Guard.[60] From Iraq, the Iranian Revolutionary Guard could join in the conquest of Israel with its allies in Syria and Lebanon. ISIS might well join forces with the Iranian Revolutionary Guard for the crusade against Israel.

Although Lebanon and Syria would be blacked-out by the EMP attack, Hamas, Hezbollah, other terror groups, and Syrian government forces of dictator Hafez Al Assad, could participate in the conquest of Israel as their military capabilities are much lower-tech and less vulnerable to EMP than the Israel Defense Forces.

[60] "U.S. Officials: Up To 100,000 Iran-Backed Fighters Now In Iraq" Fox News, August 16, 2016.

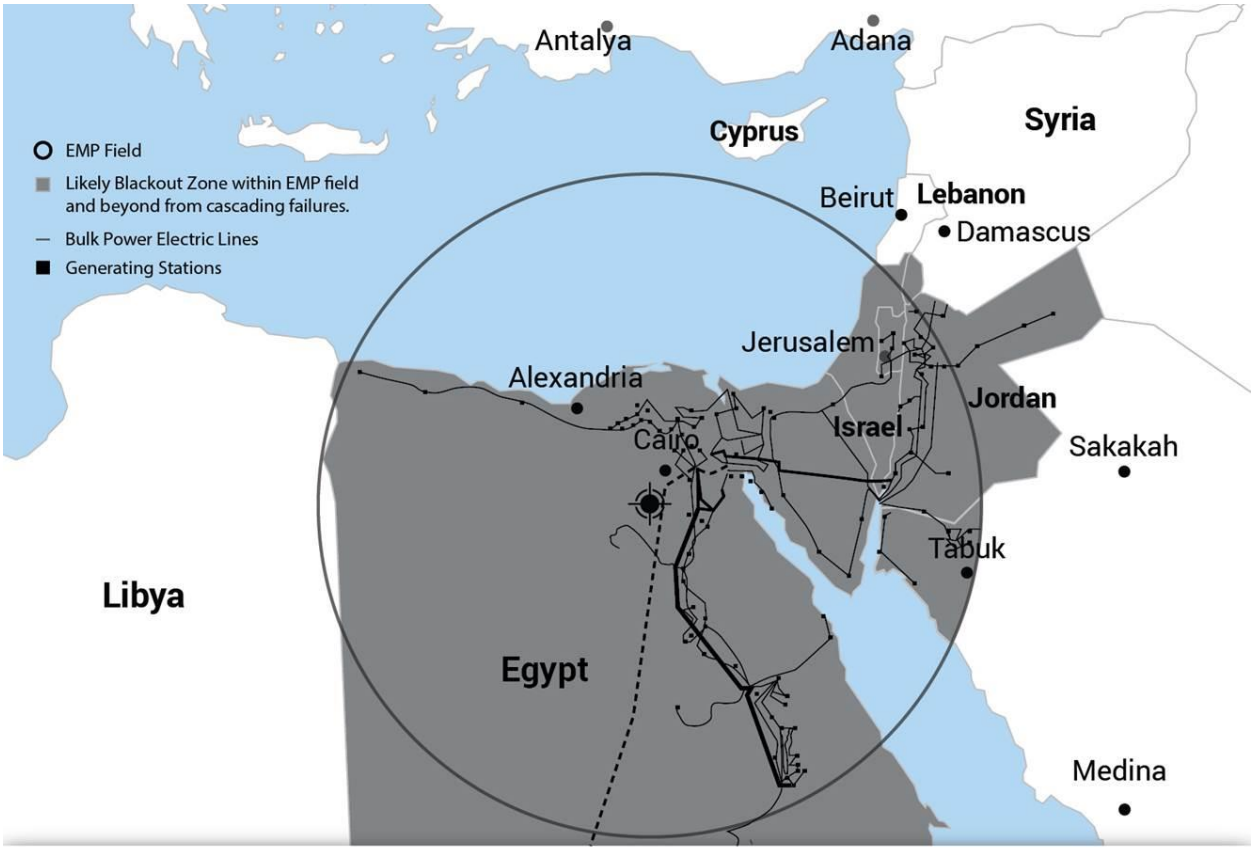
Nonetheless, in this scenario Iran regards diminishment of terrorist and Syrian government military capabilities by the EMP attack as a bonus, as these allies are also Sunni and secular rivals to Shiite Iran's bold gambit to dominate the Middle East.

EMP induced blackout of Egypt, Jordan, and partly Saudi Arabia, and paralysis of their military forces, are bigger bonuses. These Sunni enemies of Iran, and allies of the United States, are the most likely and best positioned Arab states that might try rescuing Israel.

Iran Strikes Egypt and Israel

In this alternative scenario, Iran centers an EMP attack over Cairo, to knockout Egypt and Israel, and to avoid diminishing militarily or alienating politically Iran's terrorist and government allies in Syria and Lebanon. Egypt is the most populous and militarily the strongest of the Arab nations—Iran's most serious rival to leadership of the Middle East. Egypt is also Sunni, with a secular anti-Islamist government, an ally of the United States, and friendly to Israel—which makes Egypt almost as hated as Israel by Iran.

A nuclear weapon is detonated at 30 kilometers HOB southwest of Cairo, putting the peak EMP field over Cairo, Egypt's political-military center, and over many of its most important air, army, and naval bases. Radius of the EMP extends to a distance of 600 kilometers. Examples of some



NUCLEAR EMP ATTACK SCENARIOS

IRAN STRIKES EGYPT AND ISRAEL

of Egypt's military assets covered in the EMP field are Navy Headquarters and the nation's main naval base in Alexandria, and the major air force bases such as Cairo West AFB, Abu Suwayer AFB, and Bir Gifgafa AFB. Cascading failures in the grid would blackout all of Egypt.

All of Israel is covered by the EMP field. Half of Jordan is covered by the EMP field. Cascading failures would probably blackout the whole of Jordan, which is on a single grid. Northeast Saudi Arabia is in the EMP field, but this would likely cause only localized blackouts as the region is not connected to the Saudi national grid.

None of Lebanon or Syria is covered by the EMP field. Thus, the EMP attack paralyzes Iran's enemies and spares its most important allies.

Egypt is so unstable that an EMP attack that paralyzes the government, communications, transportation, and cuts the supply of food and water might well trigger a protracted revolution or civil war, effectively destroying the state of Egypt and creating a zone of permanent chaos, as in Libya, Gaza, Lebanon, and Syria.

Iran Strikes Saudi Arabia and the Gulf States

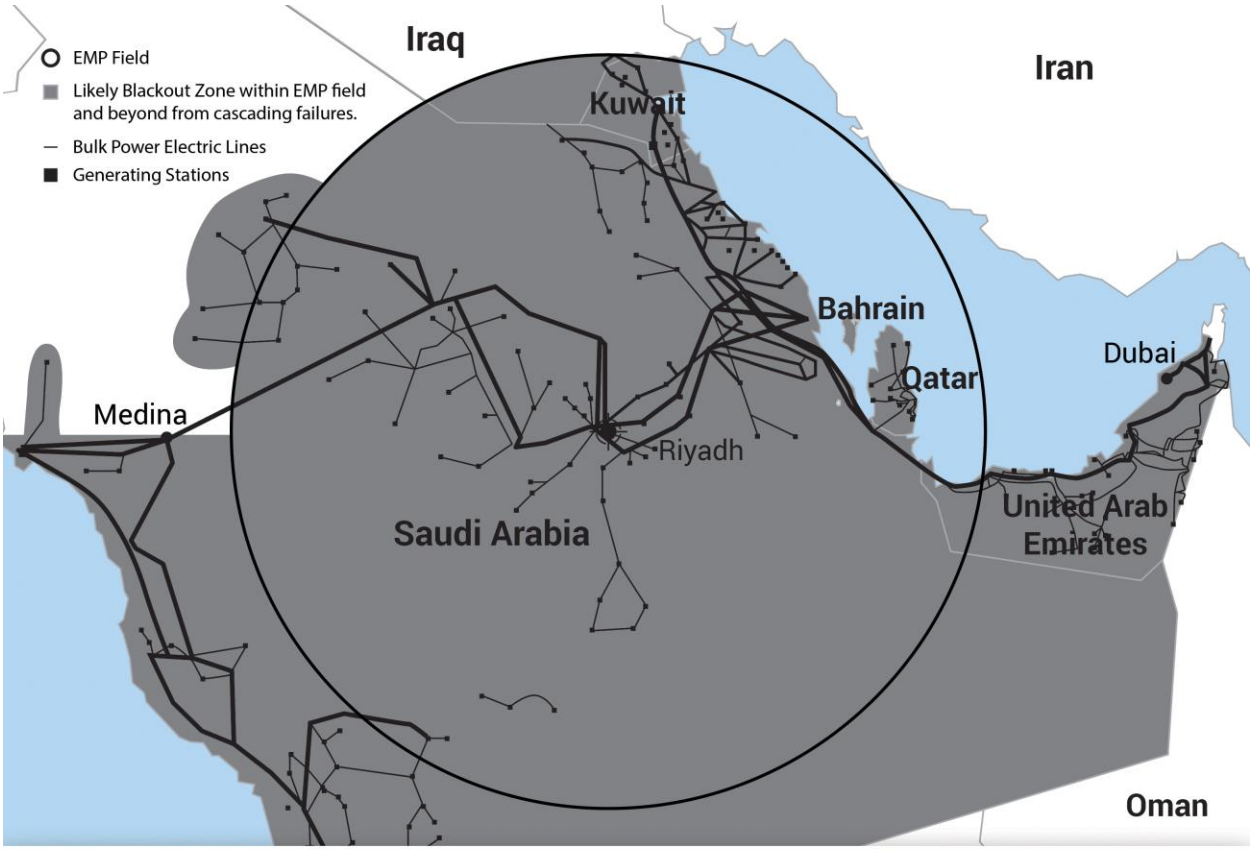
In this scenario, Iran centers an EMP attack over Riyadh, the capital of Saudi Arabia, to destroy its main ideological rival for leadership of the Muslim world in the struggle between Shiites and Sunnis. Sunni Saudi Arabia, protector of the holy cities of Mecca and Medina, has long claimed spiritual leadership of Islam, a claim legitimated to many Muslims by the blessing of Saudi oil wealth. Oil rich Saudi Arabia and its oil wealthy allies Kuwait, Bahrain, Qatar, and the United Arab Emirates, all Sunni, have used their wealth and influence with the West to lead Arab opposition to the rise of Shiite Iran.

Saudi Arabia and its Persian Gulf allies have small populations, and small militaries, that rely heavily on western jet fighters and other high-tech equipment to compensate for their lack of manpower with modern firepower. An EMP attack that neutralizes their military capabilities would be a red carpet for invasion and takeover of their oil wealth by Iran.

Iran knows that the world economy is heavily dependent upon Persian Gulf oil, and for that reason has frequently attempted to coerce the West by threatening to cutoff the supply of oil by closing the Strait of Hormuz with Iran's Navy. However, the presence of the U.S. Navy in the Persian Gulf to protect the strait makes this a hollow threat. An EMP attack that destroys Saudi Arabia and the Persian Gulf states, and better yet enables Iran to capture their oil wealth, would eliminate Iran's main Muslim ideological rival and put its foot on the throat of the world economy.

A nuclear weapon is detonated 30 kilometers HOB over Riyadh, the Saudi capital. Radius of the EMP field extends from Riyadh to a distance of 600 kilometers. The EMP field covers most of Saudi Arabia's most important military bases, including for example Riyadh Air Force Base, King Khalid AFB, Hail AFB, Al Kharj AFB, Al Kharj East AFB, Prince Sultan AFB, and Sulayel AFB. The EMP field covers all of Saudi Arabia's major oil fields and pipelines, including Jubail, Ras Tannurah, Dhahran, Dammam, and Abqaiq.

The EMP attack would probably also cause protracted blackout of all Saudi Arabia's Persian Gulf allies. The EMP field covers all of Kuwait, all of Qatar, all of Bahrain, and part of the



United Arab Emirates. The EMP would most likely trigger cascading failures through the electric grid that would blackout all of the UAE.

While accomplishing the above, the EMP field would not paralyze Iran's allies in Iraq and Yemen. Although the EMP field covers part of southern Iraq, the national electric grid is not in this region, the Al Muthanna, which is inhabited by Sunnis hostile to Iran. Iraq's Shia regions are spared.

100,000 Iranian Revolutionary Guards now in Iraq could spearhead an invasion of Kuwait, Saudi Arabia and the Persian Gulf states, while the Houthis attack from Yemen.

The attack described would avoid placing an EMP field over the holy cities of Mecca and Medina, that might be an important consideration for ideological and propaganda reasons.

Pakistan Strikes Israel

Pakistan has nuclear weapons and nuclear-armed missiles and is capable of making an EMP attack. Although nominally a U.S. ally, Pakistan supports terrorist organizations and often works at cross-purposes undermining U.S. foreign policy objectives in the war on terrorism and in U.S. efforts to contain nuclear and missile proliferation.

Radical Islam is normative in Pakistan. Israel and the U.S. are hated by the general population.[61] Many in Pakistan's intelligence services and the military are sympathetic to the Taliban and support terrorist operations. If the Taliban or radical Islamists in the military took over the reins of government, virtually overnight Pakistan could become a nuclear threat to Israel.

The current Pakistan government is hostile to Israel because of Israel's commercial and military cooperation with India--Pakistan's archenemy.[62]

Pakistan, like Iran, has aspirations to lead the Muslim world, which is one of the reasons it developed nuclear weapons. Pakistan could become the Sunni version of Iran, and shift its energies from an endless territorial struggle with India over Kashmir to asserting its military supremacy and ideological leadership of all Muslims.

Indian analyst Regan Traje in "The World Must Prepare for a Sunni Islamic Nuclear Coalition" foresees just such a development. Spurred by the threat of Shiite Iran with nuclear weapons, Sunni Saudi Arabia and newly Islamist Sunni Turkey would turn to nuclear-armed Sunni Pakistan to form what Traje calls a "Sunni Islamist Nuclear Axis":

> *"In the Sunni Islamist worldview, Dar ul Harb (the realm of war) must ultimately become Dar ul Islam (the realm of peace/submission). In this worldview, all non-Muslim states are part of Dar ul Harb and are colluding against Islam, in one way or another....To all three, the strategic benefits of a nuclear axis are undeniable. For Pakistan, any way out of its rut is a welcome one, and to emerge as leader of the Islamic world has always been its ambition. Saudi Arabia considers itself the leader of the Islamic world already, but it will probably be willing to share the table for a public nuclear umbrella over which it exercises some overt control. As for Turkey, the government of President Recep Tayyip Erdogan is turning the country into a quasi-Ottoman state with a strongly Sunni orientation....For all three, the creation of a Sunni nuclear axis covering Turkic, Arab and South Asian Muslims—who make up the bulk of the world Islamic population—promises a powerful re-orientation from their current secondary role in the global public space."*[63]

In this scenario, Pakistan makes an EMP attack on Israel to assert its leadership of the "Sunni Nuclear Axis" and the Muslim world, and through "shock and awe" to deter the West and overshadow Iran. The EMP attack, from a nuclear weapon detonated at 30 kilometers HOB over Jerusalem, would be the same EMP field as in the scenario *Iran Strikes Israel*.

However, in this scenario, where Pakistan is allied to Saudi Arabia and Turkey, the Saudis would have to be willing to sacrifice their northern cities of Tabuk and Sakakah—which they might do to destroy Israel and thereby assert their world leadership of all Muslims and also deter a nuclear Iran. Saudi money has paid for terrorist suicide bombings that have killed thousands of fellow Sunni Muslims and accomplished much less.

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[61] Pakistan is number 3 in "Countries Who Hate Israel The Most—Top Ten List" thetoptens.com, undated.
[62] "Why Israel And Pakistan Can Never Be Allies" Express Tribune, June 13, 2012; "Revealed: India Close To Signing $3 Billion Defense Deal With Israel" The Diplomat, February 10, 2016.
[63] Regan Traje, "The World Must Prepare For A Sunni Islamic Nuclear Coalition" Swarajya, July 30, 2016.

Alternatively, a Pakistan that is taken over by Taliban sympathizers would probably see Saudi Arabia as an apostate and "traitor" nation (as did Al Qaeda leader Osama Bin Laden, a Saudi Arabian and Sunni), and regard an EMP attack to destroy Israel that also injures Saudi Arabia as all for the best. In this less complicated scenario Pakistan would go rogue and attack Israel on its own.

Nuclear Terrorists Strike Israel

In this scenario, Hamas gets a nuclear weapon from Iran or from Pakistan or from North Korea [redacted]

The Hamas version of a constitutional charter calls for the destruction of Israel.

Hamas uses a Scud missile, a commercial jet doing a zoom climb, or a meteorological balloon to loft the nuclear weapon to detonate at 30 kilometers HOB over Jerusalem. Israel's Iron Dome missile defense has a ceiling of 10 kilometers. The EMP field would be identical as in the scenario above *Iran Strikes Israel*.

Hamas would regard EMP-induced protracted blackout of Egypt, Jordan, and partly Saudi Arabia as a bonus, as these are regarded as "traitor" nations. The peak EMP field would cover most of Israel probably including Gaza, the home of Hamas.

It would be the ultimate terrorist suicide bombing.

[redacted]

V THE FAR EAST

In August 2016, following the earlier crash of a B-52 bomber in Guam, sent to make a demonstration flight over the disputed South China Sea, the U.S. sent to Guam a B-52, a B-1B, and a B-2 bomber to make demonstration flights. It is the first time all three types of U.S. nuclear bomber were sent on a joint mission to the South China Sea.[65]

China protested the appearance of the nuclear bombers as a provocation. North Korea accused the United States of preparing to launch a surprise nuclear attack. The North threatened to launch preemptive missile strikes against the United States mainland and U.S. allies.[66]

On Monday, August 22, 2016, according to Fox News "Tensions Run High In Asia As S. Korea, U.S. Begin Annual Military Drills":

> *"North Korea threatened Monday to launch a nuclear first-strike and turn Seoul and Washington into 'a heap of ashes'—a threat that comes on the heel of China using its military to signal that it, too, would go to war to enforce its territorial claims."*

Plausible scenarios for nuclear EMP attack emerge from the Far East in newspaper headlines almost weekly.

North Korea Strikes South Korea and Japan

"North Korea now has three intercontinental-range missiles and is moving ahead with a sub-launched missile," according to press reports and the U.S. Air Force's National Air and Space Intelligence Center.[67] North Korea has Super-EMP weapons, according to North Korea, Russian sources, reportedly South Korean military intelligence, and at least one Chinese military commentator.[68]

In this scenario, North Korea makes an EMP attack on Japan and South Korea to achieve its three most important foreign policy goals: reunification with South Korea, revenge upon Japan, and recognition of North Korea as a world power.

Conquest of South Korea is an obsession with North Korea's political-military leaders, constituting the chief reason for the existence of North Korea. Most of North Korea's production

[65] "Air Force B-52 Crashes In Guam" MilitaryTimes.com, May 18, 2016; "B-52, B-1, B-2 Bombers Share Tarmac On Guam For First Time" Stars and Stripes, August 11, 2016.
[66] "N. Korea Threatens Attack On U.S. Military Bases In Pacific Over Bombers Deployment" Korea Herald, August 18, 2016.
[67] Bill Gertz, "Intelligence Report Warns of Growing Missile Threats" Washington Free Beacon, July 13, 2017; Defense Intelligence Ballistic Missile Analysis Committee, *Ballistic and Cruise Missile Threat* USAF National Air and Space Intelligence Center (2017).
[68] Kim Min-sek and Yoo Jee-ho, "Military Source Warns of North's EMP Bomb" JoonAng Daily, September 2, 2009; Li Daguang, "North Korea Electromagnetic Attack Threatens South Korea's Information Warfare Capabilities" Tzu Chin, No. 260 (Hong Kong: June 1, 2012) pp. 445, in "PRC Owned HK Journal Says DPRK May Build EMP Bombs To Paralyze ROK Weapons System"; Dr. Peter Vincent Pry, "Foreign Views of Electromagnetic Pulse (EMP) Attack" testimony on behalf of EMP Commission before the Subcommittee on Terrorism, Technology, and Homeland Security, Senate Committee on the Judiciary (Washington, D.C.: March 9, 2005).



NUCLEAR EMP ATTACK SCENARIOS **NORTH KOREA STRIKES SOUTH KOREA AND JAPAN**

and activity is channeled into preparations to achieve reunification with South Korea by coercion and force.

Revenge against Japan for occupation of Korea during World War II and brutal exploitation of the Korean people is a daily theme in North Korean media and government statements. China, North Korea's closest and most important ally, is almost as vociferous as the North in condemning Japan for its predations during World War II. North Korea and China both contend that Japan's imperial ambitions are unabated, now transformed into joint empire building with the United States.

Revenge against Tokyo is a convenient rationale for someday attacking Japan.

War against Japan will be necessary for the North to conquer South Korea. North Korea knows from the experience of the Korean War that war against Japan will be necessary as it was an indispensable staging area for U.S. and allied forces defending South Korea. North Korea also knows from the presence of U.S. military forces in Japan and South Korea, that the conquest of South Korea will again be opposed by U.S. forces stationed in Japan and transiting through Japanese ports and air bases from the U.S. mainland, helped by Japan's military.

North Korea's dictator, Kim Jong-Un, is the scion of three generations of totalitarian rule, a megalomaniac and ruthless murderer who is described by state media as a demigod having supernatural powers. Kim in defiance of international law is testing and deploying nuclear weapons and missiles to prove that North Korea is a world power.

North Korea's strategy is to sever U.S. security guarantees to South Korea and Japan by raising the stakes too high—raising the specter of nuclear war—and through "nuclear diplomacy" to cow the U.S. and its allies into submission.

In this scenario, North Korea detonates a nuclear weapon at 96 kilometers HOB over Tokyo. The EMP field extends from the Japanese capital to a radius of 1,080 kilometers, covering all of Japan's major home islands.

Virtually all of Japan's major military bases and seaports are covered by the EMP field, rendering them inoperable. Traffic control towers and systems are damaged and blacked-out stopping air and rail traffic. Highways are jammed with stalled vehicles. Communications systems are damaged or destroyed or in blackout.

Worse, Japan's population of 126 million people is at risk because suddenly there is no running water or food coming into the cities. EMP induced industrial accidents are happening everywhere. Gas pipelines are exploding and turning into firestorms in towns and cities. Refineries and chemical plants are exploding, releasing toxic clouds and poisonous spills. Tokyo knows from the experience of Fukushima that as the nationwide blackout becomes protracted, within days Japan's nuclear reactors will exhaust their emergency power supplies and begin exploding, contaminating the home islands with radioactivity.

As a consequence of the EMP attack, Japan's critical infrastructures are paralyzed and incapable of transporting U.S. forces to aid South Korea. Indeed, with Japan's survival at risk, Tokyo would probably oppose any effort to help South Korea by U.S. forces staging from Japan, fearing another North Korean EMP attack.

The EMP field also covers the eastern half of South Korea, including the vital seaport of Busan (the key to South Korea's survival and U.S. victory in the last Korean War). All the eastern coastal seaports, and all military bases and airfields in the eastern half of South Korea (nearest Japan) are under the EMP field.

The EMP field does not extend to North Korea.

Left uncovered by the EMP field are the western half of South Korea, including Seoul, the capital, and the major highway systems radiating around and from Seoul southward—the best invasion routes. Stalled traffic from the EMP will not be blocking Seoul or the highways.

U.S. and South Korean forces covering the demilitarized zone (DMZ) will not be covered by the EMP field. The EMP field, in their immediate rear area, will cause cascading failures of the electric grid throughout the DMZ and the entirety of South Korea. Thus, even those U.S. and South Korean forces not covered by the EMP field will be in a paralyzing protracted blackout that will cripple or deny allied forces communications, transportation, food and water, supplies and reinforcements from South Korean bases or from overseas.

The EMP attack creates conditions for North Korea's conquest of South Korea that are ideal.

China Strikes Taiwan or Taiwan and the Philippines

China has a wide variety of land-based and sea-based nuclear-armed missiles that could deliver an EMP attack. Chinese military articles and training describe making an EMP attack upon Taiwan and U.S. aircraft carriers. China has frequently conducted military exercises firing nuclear-capable missiles into the waters around Taiwan on trajectories consistent with EMP attack. Chinese and other open sources claim Beijing has Super-EMP weapons.[69]

In this scenario, China—in preparation for the conquest of Taiwan—makes an EMP attack on Taiwan and on a U.S. aircraft carrier group sailing to the island's rescue.

China regards Taiwan as part of its territory occupied by counter-revolutionary forces who could someday pose a threat to the PRC. Animosity between China and Taiwan (officially the Republic of China) dates from the end of China's civil war when the communists defeated the nationalists on the mainland in 1949 and the nationalists fled to Taiwan.

The nationalist Republic of China represented China in the United Nations (UN) until 1971, when the communist People's Republic of China took its UN seat. The United States treats Taiwan as an ally and has promised to protect the island from forcible reunification with the mainland. The U.S. under the 1979 Taiwan Relations Act continues to sell arms and provide military training. In January 2010, the Obama Administration announced it would sell $6.4 billion in arms and military supplies to Taiwan.[70]

Communist China warns that any official declaration by Taiwan of its independence or statement that reunification is impossible would be a cause for war. Over the years China has often fired missiles and artillery at Taiwan and its surrounding islands to signal Beijing's continuing displeasure with Taiwan's de facto independence.[71]

Taiwan is also invaluable real estate to China's geostrategic interests.

In China's possession, Taiwan would become an unsinkable aircraft carrier enabling China to project air and naval forces over the South and East China Seas and the near Pacific and dominate these regions—including the disputed islands and oceanic natural resources claimed by Beijing. China has been building artificial islands to serve as platforms for air and naval forces to assert its right to the oil wealth of the South China Sea and to control the ocean and air lanes.

China's capture of Taiwan would convert the South and East China Seas into virtual Chinese lakes. It would give China a stranglehold over the vital maritime trade and oil supply routes from Europe and the Middle East to Japan, South Korea, Australia, North and South America. It would close the Taiwan Straits as a potential staging area for U.S. naval forces. It would push China's defensive perimeter far out into the Pacific Ocean.

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[69] For example, see interview about EMP nuclear weapon with “the revered” He Zuoxi, Deputy Director of the Institute of Theoretical Physics and a founder of the PRC’s nuclear weapons program in: Qi Leyi, Chung-Kuo Shih-Pao, November 26, 2000, p. 13.

[70] John Ponfret, "U.S. Sells Weapons To Taiwan, Angering China" Washington Post, January 30, 2010.

[71] For example: "Taiwan Strait 21 July 1995 to 23 March 1996" GlobalSecurity.org; U.S. Department of State, "The Taiwan Straits Crises: 1954-55 and 1958" Office of the Historian.



China has massed missiles, air, ground, and naval forces on the mainland opposite Taiwan, and has practiced what appear to be invasion maneuvers. Most analysts agree that Taiwan is so heavily armed, including with an air force, that it would be very difficult if not impossible for China to project forces across the Taiwan Straits, without first reducing the island defenses.[72]

EMP appears to be the key to victory in China's military doctrine against U.S. aircraft carriers and Taiwan. For example, from the official newspaper of the Shanghai Communist Party Central Committee:

> *"The weak points of a modern aircraft carrier are: 1) As a big target, the fleet is easy for a satellite to reconnoiter and locate it, and for missiles to conduct saturation attacks; 2) A high degree of electronization is like an 'Achilles' heel' for an aircraft carrier fleet, which relies heavily on electronic equipment as its central nervous system. These two characteristics determine one tactic….Electromagnetic pulse bombs (missiles) bear the characteristics that meet those requirements: 1) The strong magnetic field and electromagnetic pulse caused by an explosion can destroy all important integrated circuits and chips…thus paralyzing the radar and telecommunications system of the aircraft carrier and vessels around it as well as*

[72] Department of Defense, Annual Report To Congress: Military and Security Developments in the People's Republic of China, Office of the Secretary of Defense, April 26, 2016.

> *the ship-mounted missiles and aircraft. 2) The scope of demolition and effective action are wide, reaching dozens of kilometers. 3) The equipment is damaged without casualties. 4) An electromagnetic pulse bomb…does not have to hit the aircraft carrier but only needs to explode within dozens of kilometers around the aircraft carrier….As long as an electromagnetic pulse bomb can successfully explode, an aircraft carrier will be paralyzed. 5) If the central nervous system of an aircraft carrier is paralyzed, even a comparatively backward naval vessel or aircraft…will be able to aim at the aircraft carrier as a conventional target, thereby thoroughly changing the balance between the strong and the weak. The possession of electromagnetic pulse bombs (missiles) will provide the conditions to completely destroy an aircraft carrier fleet, and the way to complete victory in dealing with aircraft carrier fleets."*[73]

Taiwan's military analysts agree with the People's Republic of China that, "The EMP attack scenario presents the only attack option that meets the demand for making the first, paralyzing strike of a war, paving the way for the other troops to attack Taiwan." According to a briefing to Taiwan's Military College of National Defense University entitled "Electromagnetic Pulse Attack and Defense" the People's Republic of China:

> *"Used spies in the United States and engaged Russian technical consultants, resulting in the successful manufacture of a mini bomb using implosion technology…Military experts believe the Communist Armed Forces are capable of deploying a kiloton grade EMP warheads today…The EMP attack scenario presents the only attack option that meets the demand for making the first, paralyzing strike of a war, paving the way for the other troops to attack Taiwan."*[74]

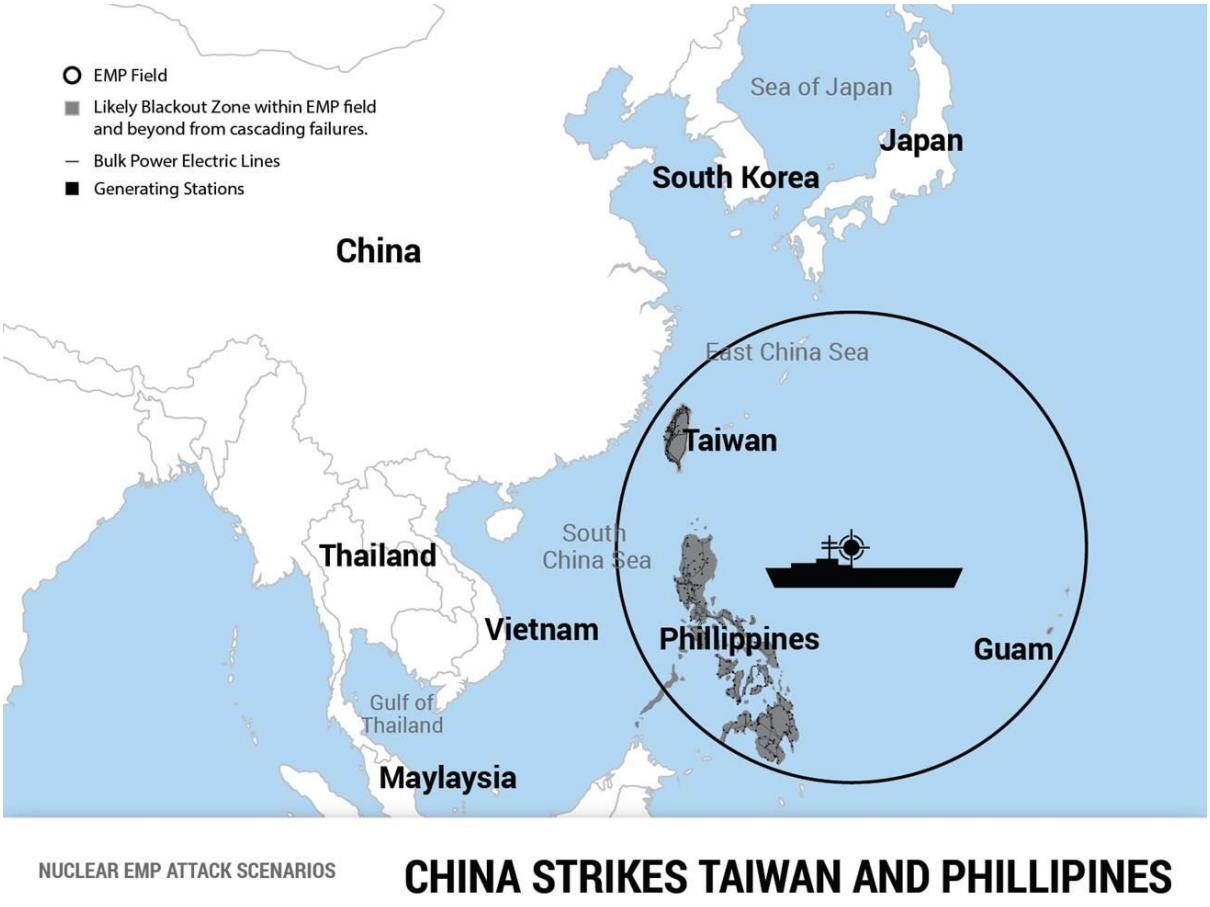
In this scenario, China detonates a nuclear weapon at 30 kilometers HOB centered over a U.S. aircraft carrier group approaching to defend Taiwan. The EMP field extends to a radius of 600 kilometers, covering all of Taiwan. The peak EMP field covers the aircraft carrier group, that is partially hardened against EMP effects, thereby optimizing chances to damage the best protected and most effective allied forces in the theater of operations.

The EMP field does not extend to China, so Chinese military forces for offensive operations and invasion are not affected.

As a consequence of the EMP attack, Taiwan's electric grid and other critical infrastructures (communications, transportation, food and water) would go into protracted blackout. While Taiwan has reportedly EMP protected some of its military communications, most of its military forces are not hardened against EMP. Aircraft, tanks, artillery, trucks, and their logistical trains could be crippled or rendered inoperable, opening the door of fortress Taiwan to invasion.

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[73] Ye Jian, "Armchair Strategy: Using A-Bomb To Deal With Aircraft Carrier," Jiefang Ribao (February 12, 2000). See also: Feng Changsong, "Six Aircraft Carrier 'Busters,'" Zhongguo Guofang Bao (March 5, 2002), p. 4. Wang Jiasuo, "Aircraft Carriers: Suggest You Keep Out of the Taiwan Strait!," Junshi Wenzhai (April 1, 2001), pp. 58-59.
[74] Dr. Chien Chung, Department of Nuclear Science, National Tsing Hua University, Military Lecturer for Military College of National Defense University, briefing "Electromagnetic Pulse and Defense" (Undated, prior to 2006).



In another scenario, a more ambitious EMP attack might center the EMP burst over a U.S. carrier group, or over a vacant aimpoint, much further out in the Pacific Ocean. Detonating a nuclear weapon at 185 kilometers HOB will generate an EMP field with a radius of 1,500 kilometers—enough to cover all of Taiwan, most of the Philippines, and the approaches to Taiwan from the near Pacific including the U.S. territory and naval base on Guam.

This EMP attack would affect Filipino and U.S. forces based in the Philippines and Guam that oppose Beijing's claim to the South China Sea and that might try to help Taiwan. If China cannot precisely locate the U.S. carrier group in the Pacific, the larger EMP field will solve that problem—and send a bigger message warning Washington against intervention.

Significantly, some U.S. allies might perceive a nuclear EMP attack by China or other potential adversaries as acceptable use of a nuclear weapon—even if the EMP effects their own territory. Such attitudes of acceptance, even if a nonofficial minority view, could encourage China and others to believe that their military doctrines are correct that nuclear EMP attack has the least escalatory risk of any nuclear option, may not be perceived as an act of nuclear war, and could be the best way of using nuclear weapons to "de-escalate" and prevail in a crisis or conflict.

Consider for example how Beijing might interpret the analysis below from a Japanese scholar and military analyst, who writes of a nuclear EMP attack by China on Taiwan, even if EMP

effects Japan—"the use of a nuclear weapon which would not harm humans, animals, or property would be valid" while EMP would be so effective militarily that China would conquer Taiwan "inevitably":

> *"Although there is little chance that the Beijing authorities would launch a nuclear attack, which would incur the disapproval of the international community and which would result in such enormous destruction that it would impede post-war cleanup and policies, a serious assault starting with the use of nuclear weapons which would not harm humans, animals, or property, would be valid. If a one kiloton nuclear warhead was detonated 40 kilometers above Taiwan, an electromagnetic wave would be propagated which would harm unprotected computers, radar, and integrated circuits on the ground within a 100 kilometer radius, and the weapons and equipment which depend on the communications and electronics technology whose superiority Taiwan takes pride in would be rendered combat ineffective at one stroke. It would only take two 1 kiloton warheads to render all the military and civilian communications and electronics equipment throughout the island powerless in an instant, and if they were detonated in the sky in the vicinity of Ilan, the effects would also extend to the waters near Yonakuni [in Okinawa], so it would be necessary for Japan, too, to take care. Those in Taiwan, having lost their advanced technology capabilities, would end up fighting with tactics and technology going back to the 19th century…they would inevitably be at a disadvantage with the PLA and its overwhelming military force superiority."*[75]

[75] Su Tzu-yun, Jadi, June 1, 2000. For an equivalent European view see Wolfgang Haas interview "Infowarfare and the Military Strategy of the Bundeswehr" Telepolis, November 23, 1998. For an equivalent Indian view that notes "And a high-altitude exo-atmospheric explosion may not even kill a bird on the ground" see Dean Matthew, "A Suicidal Doctrine," The Indian Express, September 17, 1999.

VI EUROPE

For the first time since the end of the Cold War, the U.S. and its NATO allies are concerned about a major European war. Russian annexation of Crimea, support of a war in Ukraine, cyber blackout of Western Ukraine, large-scale military exercises simulating invasions and nuclear strikes against NATO, and nuclear threats against NATO voiced regularly by Moscow, cast the shadow of a New Cold War over Europe.

According to the former deputy chief of NATO, British General Richard Shirreff, "Nuclear war with Russia is possible with a year."[76]

On July-8-9, 2016, President Obama and officials of the 28 NATO member states met in Warsaw and agreed to deploy 4,000 NATO troops to Poland and the Baltic states as a "tripwire" to deter Russian aggression.[77] In August 2016, Russia mobilized over 40,000 troops and thousands of tanks and armored vehicles at five places on the border of Ukraine claiming it was a "snap exercise." Some Western experts feared the exercise was cover for an impending annexation of Ukraine, or rehearsal for an invasion of NATO.[78]

Russia Strikes European NATO

Russia has a wide variety of missile systems that could execute a nuclear EMP attack. Russian military doctrine regards EMP attack as "the ultimate cyber weapon" and the key to decisive victory in a future war. EMP attack is also ideal for implementation of Russia's military doctrine of "nuclear de-escalation" where Russian first use of a nuclear weapon exploits "shock and awe" to intimidate an adversary into negotiation and surrender. Russian EMP experts told the Congressional EMP Commission that Russia has Super-EMP weapons, as claimed by Russian open sources.[79]

In this scenario, Russia makes an EMP attack on European NATO to paralyze their military capabilities, and to deter the U.S. and European governments, while Moscow annexes Ukraine and the Baltic states. The objective is to shatter NATO militarily and psychologically while Russia begins a series of campaigns to reconstitute the USSR by first conquering Ukraine and the Baltic NATO states of Lithuania, Latvia, and Estonia, while later moving to annex Georgia, Armenia, Azerbaijan, Kazakhstan and the other former Soviet territories in Central Asia.

Russian dictator Vladimir Putin, a former KGB agent, laments the disintegration of the Soviet Union as "the greatest geopolitical catastrophe of the century" and appears determined to reconstitute the USSR.[80]

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[76] "Ex-General Says NATO-Russia Nuclear War 'Possible Within A Year'" RT, May 18, 2016.
[77] "NATO Agrees To Reinforce Eastern Poland, Baltic States Against Russia" Reuters, July 8, 2016.
[78] "Vladimir Putin Masses 40,000 Troops On Border With Ukraine" The Sun, August 18, 2016; "Ukraine Fears An Upcoming 'Full-Scale Invasion'" DailyCaller.com, August 18, 2016.
[79] "Russia: Nuclear Response To America Is Possible Using Super-EMP Factor", Aleksey Vaschenko, "A Nuclear Response To America Is Possible" Zavtra, November 1, 2006; "Threat Posed By Electromagnetic Pulse (EMP) Attack" Hearing before the House Armed Services Committee, Washington, DC: July 10, 2008.
[80] "Putin Deplores Collapse of USSR" BBC News, April 25, 2005; "Soviet Collapse A 'Tragedy,' Putin Says" NBCNews.com, April 25, 2005.

Putin and Russian military doctrine assert the right to protect ethnic Russians, or those who culturally identify as Russians, even if they are foreign nationals living in another country.[81] It is the same rationale used by Adolph Hitler to justify aggression against Czechoslovakia and Poland—to defend "German minorities" from alleged persecution.

Putin claims ethnic and cultural Russians living in Ukraine and the Baltics are persecuted minorities.

In August 2016, Putin accused Ukraine of sending saboteurs to terrorize Russians in the annexed territory of Crimea, just before launching a "snap exercise" that mobilized thousands of troops on Ukraine's borders.[82] Hitler concocted false "acts of aggression" by Czechoslovakia and Poland before crushing these nations under German tank treads.

Reconstructing the USSR, on the map, looks like an impossible task because of the vast territories that need to be recaptured. In fact, all of the former Soviet republics on the periphery of Russia—including Ukraine and the Baltic states—are hollow militarily.

Kazakhstan, for example, is the ninth largest nation in the world, but has only 18 million people, a small and obsolete military that is really more like a police force, and vast natural resources. Weakness and wealth are tempting to Moscow, and the Kazakhs know it. Kazakh officials wondered aloud, to a U.S. delegation to Astana in 2014, when the Russian tanks will be coming.

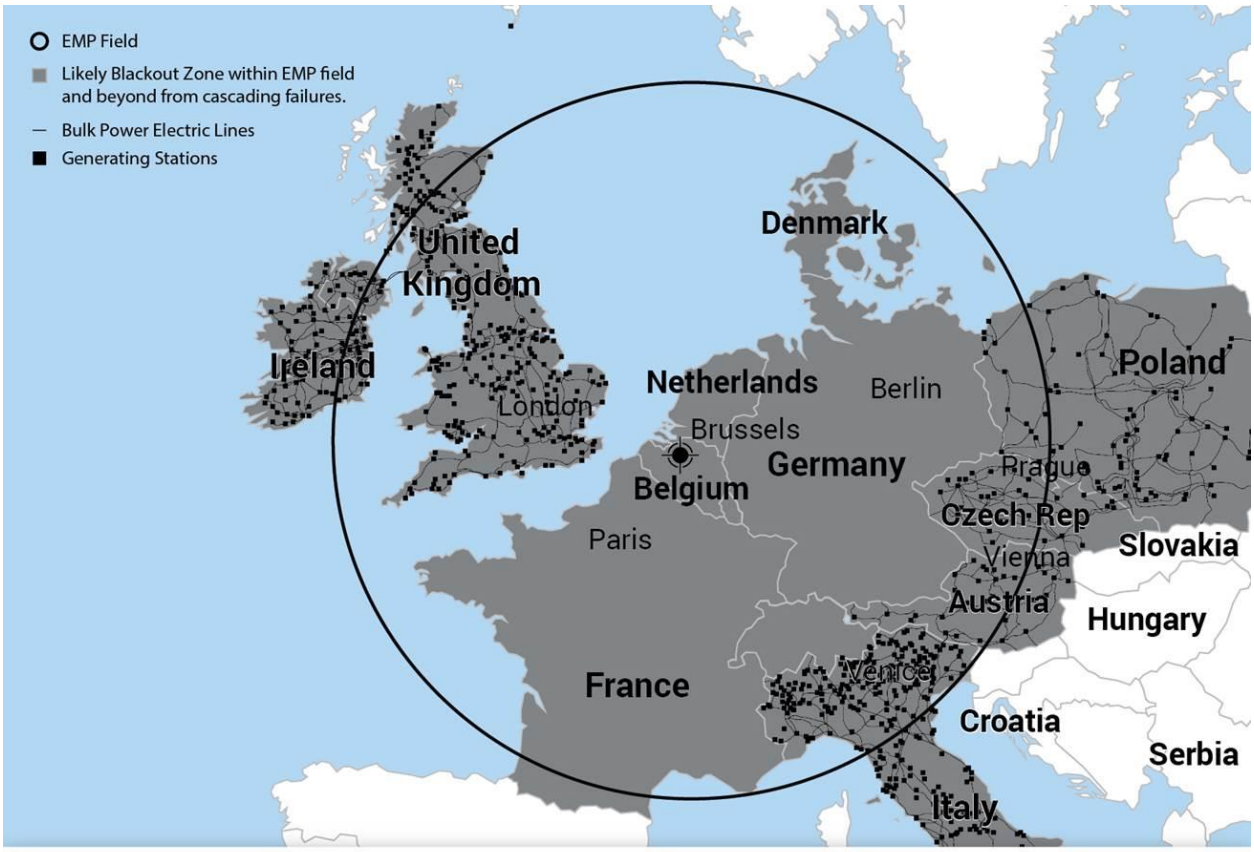
Russia also has an interest in annexing the Baltic states and Ukraine so it does not eventually lose its Russian territories of Kaliningrad and the Trans-Dneister in Moldova, neither of which is contiguous to Russia but territorially separated by the Baltics, Belarus, and Ukraine. Russia has converted Kaliningrad and the occupied part of Moldova into heavily armed camps.

Historically, states that are territorially divided want to take over intervening territory to achieve geographic unification, a situation ripe for war, as was the case with East and West Pakistan.

European NATO has neglected investing in defense, because they thought the Cold War would never return, and become militarily hollow. The weakest part of NATO is opposite Russia in the Baltic states, Poland and other East European NATO frontline nations. RAND and the U.S. Defense Department estimate the Russian Army can roll over the Baltic states in 60 hours.[83]

Moscow must wonder about the political will of European NATO governments that neglect their military and will not even defend their borders or peoples from the predations of mass migrations from the Middle East.

[81] "Putin Pledges To Protect All Ethnic Russians Anywhere. So Where Are They?" Radio Free Europe, April 10, 2014.
[82] "Putin Accuses Ukraine of Plotting Terrorist Attacks in Crimea" New York Times, August 10, 2016.
[83] "Revealed: Russian Invasion Could Overrun NATO In 60 Hours" The National Interest, February 4, 2016.



In this scenario, Russia detonates a nuclear weapon at 60 kilometers HOB over NATO Headquarters in Brussels, Belgium.

The EMP field extends to a radius of 850 kilometers, covering all the Benelux countries and all of Germany. The EMP field encompasses nearly all of France, covering to the Mediterranean Coast, and beyond Bordeaux on the Bay of Biscay, leaving only the far south outside the field. Nearly all the United Kingdom is covered by the EMP field except the far north of Scotland beyond Edinburgh. The EMP field covers virtually all Great Britain's military bases, including the home of its Trident nuclear submarines at Faslane, and the other major naval bases at Portsmouth and Devonport (the largest naval base in Western Europe).

The EMP field covers all of Denmark, including the capital at Copenhagen, half the Czech Republic, half of Austria, and northern Italy as far as Venice. All of these nations have single integrated electric grids that will probably, because of cascading failures induced by EMP, go into protracted blackout nationwide.

The EMP field covers western Poland to Poznan. Hundreds of kilometers of 400 kilovolt high power lines and many EHV transformer substations are exposed to EMP, which almost certainly will cause cascading failures blacking-out all of Poland. Consequently, the Polish military is crippled. It is 1939 all over again.

The EMP field does not cover the virtually defenseless Baltic states, Russia's heavily armed military enclave at Kaliningrad, or Russia's ally Belarus, who participates in Russian exercises simulating war against NATO.

Russian tanks roll over the Baltic states in 60 hours.

In six months, probably much less if tactical nuclear weapons are brandished or used, Moscow can reclaim the territories of the former USSR, while NATO struggles to recover. If NATO can ever recover.

European NATO is paralyzed. Its military capabilities are disrupted, damaged, and destroyed by the direct effects of EMP and by blackout of electric grids and other critical infrastructures essential to military operations and national survival. The highest priority of NATO's European governments would be to restore electric power, get lights, communications, transportation, food and water running again, to maintain law and order, avert societal collapse into chaos.

Europe probably would not support, would vehemently object, to the U.S. trying to prosecute a war against Russia from NATO Europe—as this would guarantee another EMP attack. U.S. long-range Global Strike capabilities would be too little too late to save the Baltic states.

Instead of defending the Baltic states, the highest priority of the United States would almost certainly be to rescue and recover Europe from catastrophe.

But even if stopping Russian aggression remains the highest priority for the Pentagon, will the White House be willing to risk a nuclear holocaust in order to protect the sovereignty of places like Lithuania and Kazakhstan?

ISIS Strikes Italy

Followers of Abu Bakr al-Baghdadi, messianic leader of the Islamic State in Iraq and Syria (ISIS), have threatened to make a missile strike on the Vatican in Rome. ISIS threats against Rome have been advertised on social media to their audience worldwide. For example, according to Voice of America (February 2015):

> *"Islamic State militants are goading Italy on their social media accounts by urging jihadist recruits to go to Libya in preparation for attack on Rome....The online propaganda offensive comes as Italian authorities ramp-up security measures...outlining plans to put 4,800 soldiers on the streets in Rome and in other major cities....One IS supporter even argued that the distance between Libya and Italy allows Scud missiles to be fired at Rome..."*

ISIS agents in Rome have been arrested plotting attacks on the Vatican and the Israeli Embassy.[84]

Ideologically, an attack on the Holy See fits in with the ISIS apocalyptic worldview. ISIS claims to be the champion of Islam come to destroy the world's false religions, Catholicism being chief among them, in a final confrontation between the "true religion" and its enemies, during these

[84] "Italy Uncovers Islamist Plot to Attack Vatican and Israeli Embassy," Newsweek, April 28, 2016.



final days of the world's end time. Crucifixions by ISIS, now higher profile than since Roman times, are supposed to be a symbolic harbinger of the coming Apocalypse and triumph of Islam, mocking Catholicism and Christianity.

ISIS has at least one Scud missile that it has paraded on social media. How ISIS acquired a Scud is unclear, although it was likely captured from the Syrian Army or from Syrian rebels. Contrary to some optimistic reporting in the press, the missile probably works, or can be made to work. ISIS can certainly figure out how to fire a Scud.

Scuds are engineered to be robust missiles that can take a lot of punishment and are easy to use, literally "designed by geniuses to be used by idiots." Houthi rebels and terrorists in the rough desert country of Yemen have successfully operated and used Scuds. In June 2016, the Houthis launched a Scud strike on King Khalid Air Force Base in Saudi Arabia, killing Lt. General Ahmed al-Shaalan, Chief of the Saudi Arabian Air Force. Reportedly, "South Korean intelligence officials said...20 Scud missiles fired at Saudi Arabia from Yemen by Houthi rebels and their allies originated in North Korea."[85]

Anything the Houthis can do, ISIS can do, and probably better. But even if ISIS has a Scud-D, the missile does not, from the ISIS "caliphate" in Syria, have the range to reach Rome.

[85] VICE News, July 29, 2015.

However, as the richest, largest, and most sophisticated terrorist organization in the world, ISIS might be able to engineer a spectacular act of destruction that finally eclipses rival Al Qaeda's 9/11 attacks on New York City and Washington, D.C. If New York and Washington are the economic and political capitals of the United States, Rome is the spiritual capital of Western Civilization and of the biggest religious rival to Islam.

In this scenario, ISIS buys a freighter with a nuclear-armed Scud missile in its hold from North Korea, which is strapped for cash and furious over UN economic sanctions. North Korea has threatened to sell nuclear weapons to terrorists, according to an intelligence report to Congress.[86]

ISIS makes a ship-launched EMP attack, detonating the Scud at HOB 30 kilometers over Vatican City.

The EMP field extends to a radius of 600 kilometers around Rome, covering all of Italy, including Sicily and Sardinia, and all Switzerland. The EMP field reaches across the Adriatic Sea and covers the Balkan states, Serbia, Albania, Bosnia-Herzegovina, Croatia, and Slovenia. ISIS would surely see this as divine justice for the "ethnic cleansing" of Muslims during the Yugoslav Wars of 1991-2001, and as punishment for Muslim "traitors" now living in peace with their Christian neighbors.

The EMP field covers most of Austria to Vienna, and significant parts of the electric grids in France, Germany, and Hungary. Across the Mediterranean in North Africa, the EMP field covers part of Tunisia including the capital, Tunis. All of these nations would probably go into protracted blackout from cascading failures that cause massive damage to their electric grids nationwide.

The stage is now set for ISIS cells in Europe to arise, and for ISIS fighters in Libya to cross into blacked-out Italy, and everywhere make bloody chaos. It would be like the Mumbai and Paris massacres on an international scale.

ISIS would finally eclipse Al Qaeda in everything.

[86] "N. Korea Would Sell Nukes To Terrorists" Washington Times, February 5, 2008.

VII NORTH AMERICA

Some plausible scenarios for EMP attacks against North America include the following:

- *Russia Strikes Canada*. The U.S. retaliates with long-range conventional bomber and cruise missile strikes for Russian aggression against European NATO, so Russia makes an EMP "warning shot" against Canada, that also damages U.S. early warning radars and National Missile Defenses in Alaska, hoping the U.S. will "de-escalate" and stop fighting.[87]
- *China Strikes the United States*. Amidst an escalating conflict with the U.S. over Taiwan and the South China Sea, China makes an EMP attack blacking-out the mainland's 48 states, hoping to knock the U.S. out of the war.
- *Iran Strikes the United States.* The former Obama Administration is wrong, and critics are right, that Iran already has nuclear-armed missiles, and can make an EMP attack against the U.S. by satellite, which Iran does to destroy the "Great Satan" that is the United States.
- *Al Qaeda Strikes the United States.* North Korea or Iran provides Al Qaeda with a nuclear armed short- or medium-range missile in a freighter, to make a nuclear EMP attack by proxy to eliminate the U.S. as an actor on the world stage.
- *North Korea Strikes Texas.* North Korea makes an EMP attack using a Scud missile launched from a freighter to blackout the Texas electric grid as a "warning shot" for the U.S. to stop "aggressive" military exercises and deployment of the Terminal High Altitude Area Defense (THAAD) missile defenses to South Korea.

Two of the most plausible scenarios are below.

North Korea Strikes the United States

On Wednesday August 24, 2016, North Korea successfully launched a ballistic missile from its Simpo-class submarine, 5 more of which are reportedly under construction, thereby demonstrating yet another platform from which the North could potentially make nuclear missile strikes on the United States. North Korea already has two different classes of mobile ICBMs, the KN-08 and KN-14, both of which are assessed by the U.S. Department of Defense as capable of hitting the United States.[88]

North Korea also has orbiting over the United States two satellites, the KMS-3 and KMS-4, that are potential nuclear EMP threats. Both satellites orbit on south polar trajectories, so they overfly the U.S. from the south, where the U.S. is blind and defenseless as Ballistic Missile Early Warning Radars and National Missile Defenses are oriented northward, or eastward and

[87] "The EMP Threat To Canada" Mackenzie Institute, October 22, 2015.
[88] Bill Gertz, "Intelligence Report Warns of Growing Missile Threats" Washington Free Beacon, July 13, 2017; Defense Intelligence Ballistic Missile Analysis Committee, *Ballistic and Cruise Missile Threat* USAF National Air and Space Intelligence Center (2017); Department of Defense, *Military and Security Developments Involving the Democratic People's Republic of North Korea*, Report to Congress, Office of the Secretary of Defense, January 5, 2016.

westward, looking for missile threats coming over the North Pole or from the Atlantic or Pacific oceans.[89]

North Korea's KMS-3 and KMS-4 satellites may be armed with Super-EMP weapons to generate an EMP field over the United States.[90]

Dr. William R. Graham, as Chairman of the Congressional EMP Commission, in a hearing before the House Armed Services Committee on July 10, 2008, warned that two senior Russian generals told the EMP Commission that Russia has developed what they call "Super-EMP" nuclear weapons, and Super-EMP nuclear weapons technology was transferred by Russians to North Korea:

> *MR. BARTLETT: It is my understanding that, in interviewing some Russian generals, that they told you that the Soviets had developed a "Super-EMP" enhanced weapon that could produce 200 kilovolts per meter at the center?*
>
> *DR. GRAHAM: Yes, Mr. Bartlett. We engaged two senior Russian generals—who were also lecturers and authors from their general staff academy, who had written about advanced weapons—and actually brought them over to the U.S. and spent a day meeting with them and questioning them about EMP-type weapons; and they said a number of interesting things. One was that, in fact, the Russians had developed what they called the "Super-EMP" weapon that could generate fields in the range of 200 kilovolts per meter. And we had seen in other open literature that the Russians appeared to be using that figure as an upper bound for the kind of EMP that could be produced by nuclear weapons. So, we weren't surprised, too surprised, to see it. They also told us that there were Russian and other technologists, engineers and scientists, who were working with North Korea and receiving Western wages, they emphasized helping North Korea with the design of its nuclear weapons....*
>
> *MR. BARTLETT: This is about, what, four times higher than anything we ever built or tested to, in terms of EMP hardening?*
>
> *DR. GRAHAM: Yes.*[91]

A Super-EMP warhead, in the possession of Russia or North Korea, could put at risk the best protected U.S. assets, even threatening the survival of the U.S. nuclear deterrent. This point is emphasized in the continuing exchange between Rep. Bartlett and Dr. Graham at the congressional hearing on EMP:

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[89] Ambassador R. James Woolsey, Dr. William Graham, Ambassador Henry Cooper, Fritz Ermarth, Dr. Peter Vincent Pry, "Underestimating Nuclear Missile Threats From North Korea And Iran" National Review, February 12, 2016.
[90] Ibid.
[91] "Threat Posed By Electromagnetic Pulse (EMP) Attack" Hearing before the House Armed Services Committee, Washington, D.C.: January 10, 2008.

MR. BARTLETT: Which means that, even if you were some hundreds of miles away from that, that it would be somewhere in the range of 50 to 100 kilovolts per meter at the margins of our country, for instance?

DR. GRAHAM: Yes. Over much of the margin, yes.

MR. BARTLETT: So, we aren't sure that much of our military would still be operable after that robust laydown. Is that correct?....I also understand that we aren't certain that we could launch, through a series of robust EMP laydowns, that we could launch our intercontinental ballistic missiles.

DR. GRAHAM: We designed both the missiles and their bases and the strategic communications systems during the Cold War to be able to survive and operate through EMP fields on the order of 50 kilovolts per meter, which was our concern at the time, before we realized that weapons could be designed that had larger EMP fields.[92]

Ambassador Woolsey warns North Korea's satellites may pose a constant EMP threat, a sword of Damocles always hanging overhead:

"The president and the press is missing, or ignoring, the biggest threat from North Korea—their satellites. On February 7, North Korea orbited a second satellite, the KMS-4, to join their KMS-3 satellite launched in December 2012. Both satellites now are in south polar orbits, evading many U.S. missile defense radars and flying over the United States from the south, where our defenses are limited. Both satellites—if nuclear armed—could make an electromagnetic pulse (EMP) attack that could blackout the U.S. electric grid for months or years, thereby killing millions. Technologically, such an EMP attack is easy—since the weapon detonates at high-altitude, in space, no shock absorbers, heat shield, or vehicle for atmospheric re-entry is necessary. Since the radius of the EMP is enormous, thousands of kilometers, accuracy matters little...Moreover, North Korea probably has nuclear weapons specially designed, not to make a big explosion, but to emit lots of gamma rays to generate high-frequency EMP. Senior Russian generals warned EMP Commissioners in 2004 that their EMP nuclear warhead design leaked 'accidentally' to North Korea, and unemployed Russian scientists found work in North Korea's nuclear weapons program....Such an EMP nuclear warhead could resemble an Enhanced Radiation Warhead (ERW, also called a Neutron Bomb), a technology dating to the 1950s, deployed by the U.S. in the 1980s as the W48 ERW artillery shell, weighing less than 100 pounds."[93]

"Are EMP warheads on those North Korean satellites?" Ambassador Woolsey queries.[94]

Many think there might be, including such senior Reagan administration national security officials as Dr. William Graham, Fritz Ermarth, and Ambassador Cooper.[95]

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[92] Ibid.
[93] Ambassador R. James Woolsey, "The Miniaturization Myth" Washington Times, April 24, 2016.
[94] Ibid.

Many dismiss nuclear threats from North Korea as "bluster" and "saber rattling" designed to coerce economic and diplomatic concessions, and as propaganda for a domestic audience in North Korea. But Kim Jong-Un's nuclear missile tests and hysteria have so far only increased international sanctions against the North and further isolated his "Hermit Kingdom." The North Korean dictator has absolute power over his people and no need to enthrall them with costly nuclear missile programs—which are literally starving thousands to death.

Kim Jong-Un's nuclear threats should be taken very seriously.

Kim is the twisted product of over 70 years of absolute power, inherited from his father and grandfather—as they were, he is corrupted absolutely. Kim's megalomania and paranoia are psychopathic. The so-called Democratic People's Republic of Korea masquerades as an atheistic Stalinist dictatorship, but is in fact a theocracy dedicated to the worship of Kim Jong-Un. Kim is described in state media as endowed with superhuman characteristics, including a divine halo that sometimes magically appears. Kim has murdered hundreds of thousands of his own people and invented especially cruel ways of killing friends and close relatives.[96]

Kim Jong-Un is Caligula, in the third generation, armed with nuclear weapons.

In this scenario, Kim Jong-Un becomes convinced that the United States is becoming too dangerous, too bold in pushing for economic sanctions against North Korea, and too aggressive in military exercises with South Korea.

While some officials and the press dismiss as "bluster" North Korea's threats to launch a nuclear preemptive strike in response to U.S.-South Korean military exercises, it is possible and even likely Pyongyang regards the annual exercises as a real threat. The U.S., Russia, China, and North Korea all subscribe to the view that a military exercise could conceal a surprise attack. In 1983, Moscow nearly launched a preemptive nuclear strike in mistaken belief that an annual NATO exercise, ABLE ARCHER-83, this time concealed a surprise nuclear attack.[97]

Kim Jong-Un is at least as paranoid as was Moscow during the height of the Cold War, and entirely capable of misconstruing an allied military exercise as an existential threat. Kim decides to strike first, before the U.S. destroys his regime, an act Kim believes will make him the most feared and most powerful man in the world.

North Korea delivers a nuclear weapon by satellite, detonated at 400 kilometers HOB over the geographic center of the United States. The EMP field extends to a radius of 2,200 kilometers, covering the U.S., most of Canada and Mexico.

The U.S. East, West, and Texas electric grids collapse, as do the Canadian and Mexican grids. Unprotected against EMP, hundreds of EHV transformers are destroyed and millions of SCADA systems and other critical electronics, leaving damage too broad and too deep to repair, requiring years, if the U.S. could survive for years.

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[95] “Underestimating Nuclear Missile Threats From North Korea And Iran” op. cit.
[96] "In Hail of Bullets and Fire, North Korea Killed Official Who Wanted Reform" New York Times, March 12, 2016.
[97] "The 1983 Nuclear War Scare—And Today" Family Security Matters, November 6, 2015; President's Foreign Intelligence Advisory Board , *The Soviet "War Scare"* PFIAB, February 15, 1990; Dr. Peter Vincent Pry, *War Scare*, Praeger, 1999.

But there is no coming back.

Everything is in blackout and nothing works. The EMP sparks widespread fires, explosions, all kinds of industrial accidents. Firestorms rage in cities and forests. Toxic clouds pollute the air and chemical spills poison already polluted lakes and rivers. In seven days, the over 100 nuclear power reactors run out of emergency power and go Fukushima, spreading radioactive plumes over the most populous half of the United States. There is not even any drinking water and the national food supply in regional warehouses begins to spoil in three days. There was only enough food to feed 320 million people for 30 days anyway.

In one year, as some EMP experts have warned for over a decade, 9 of 10 Americans are dead from starvation, disease, and societal collapse.[98] The United States of America ceases to exist.

Russia Strikes the United States

In this scenario, Russia invades and annexes NATO's Baltic states and Ukraine, as a first step toward reunification of the former territories of the Union of Soviet Socialist Republics (USSR). Russia makes an EMP attack on European NATO, centering the attack on NATO Headquarters in Brussels, blacking-out and paralyzing the great powers of Europe.

Simultaneously with the EMP attack, Russian embassies in the 28 NATO member states—including the United States—warn that any NATO attempt to intervene militarily will be met with additional EMP attacks, escalating if necessary to nuclear ground-bursts on NATO military targets and all-out nuclear war.

European NATO is cowed, their militaries helpless. But the United States defies Russia.

The U.S. retaliates with long-range conventional strikes using bombers and cruise missiles, initially concentrating on Russian military forces in the Baltic states. Gradually the U.S. escalates its conventional strikes to include crucial military and economic targets in Russian territory. The U.S. strategy is to rely on its non-nuclear Global Strike capabilities to increase pressure on Russia, hopefully forcing Moscow to retreat from the Baltics and abandon its scheme to become again "Great Russia."

Russian dictator Vladimir Putin—former KGB agent, national chauvinist, still humiliated by the USSR's defeat during the Cold War—cannot countenance losing again to the United States. If he retreats now, he will lose face before his own people. A coup against his government, maybe a popular revolution, and Putin's assassination would be real possibilities.

In 1999, senior Russian officials threatened a U.S. congressional delegation with an EMP attack against the United States to stop U.S. bombing of Russian ally Serbia—much lesser stakes than in this scenario.[99]

Forward deployed Russian submarines make short-warning EMP attacks using Super-EMP warheads to paralyze U.S. strategic and general purpose forces and blackout the national grid.

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[98] "Threat Posed By Electromagnetic Pulse (EMP) Attack", op. cit., p. 9.

[99] Hearing on the Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack, House Armed Services Committee, Washington, D.C.: July 22, 2004; Peter Huessy, "Electronic Doomsday For The U.S.?—The Electromagnetic Pulse (EMP)" Gatestone, January 13, 2016.

Fourteen EMP bursts are at 30-100 kilometers HOB to maximize peak field strength, centered on 14 U.S. strategic C3I and strategic forces targets:

- National Missile Defenses at Fort Greely, Alaska.
- National Missile Defenses at Vandenberg AFB, California.
- Washington, D.C.
- North American Aerospace Defense Command (NORAD) Headquarters at Petersen AFB and the Alternate Headquarters inside nearby Cheyenne Mountain, Colorado.
- 91st ICBM Missile Wing and B-52 Bomber Wing at Minot AFB, North Dakota.
- 90th ICBM Missile Wing at F.E. Warren AFB, Wyoming.
- 341st ICBM Missile Wing at Malmstrom AFB, Montana.
- B-2 Bomber Wing at Whiteman AFB, Missouri.
- B-52 Bomber Wing at Barksdale AFB, Louisiana.
- B-1B Bomber Wing at Ellsworth AFB, South Dakota.
- B-1B Bomber Wing at Dyess AFB, Texas.
- Trident SSBN Base at Bangor, Washington.
- Trident SSBN Base at King's Bay, Georgia.
- C3I TACAMO Wing of E-6B aircraft for emergency communications (to ICBMs, bombers, and patrolling submarines) at Tinker AFB, Oklahoma.

The Congressional EMP Commission *Executive Report* (2004) warned: "Current policy is to continue to provide EMP protection to strategic forces and their controls; however, the end of the Cold War has relaxed the discipline for achieving and maintaining that capability within these forces."[100]

Moreover, compared to the Cold War, today U.S. strategic forces are less ready and more vulnerable to surprise attack, perhaps especially from EMP:

- U.S. strategic bombers are no longer armed and on strip alert, ready to takeoff on short warning, but must be made ready, including having weapons uploaded.
- U.S. ICBMs and submarine-launched ballistic missiles (SLBMs) are "de-targeted" so they are no longer aimed at targets in Russia, but aimed at the oceans, as a safeguard against accidental launch. Before launching, ICBMs and SLBMs must be re-targeted, which can be done quickly, but depends upon a vast array of computers and data links called the Rapid Execution and Combat Targeting System.
- U.S. ballistic missile submarines (SSBNs) are far less numerous today than during the Cold War, when 41 SSBNs were deployed. Today the SSBN fleet numbers 14 Tridents. Normally, 7 Tridents are at their ports in Bangor and King's Bay, so half the fleet would be caught at their berths by a surprise attack.
- U.S. SSBNs at sea no longer carry launch codes to permit an independent retaliatory strike in the event of decapitation of the National Command Authority, but must receive an Emergency Action Message from the President that includes launch code data.
- Take Charge And Move Out (TACAMO) aircraft are the only remaining redundant communications link to the three legs of the strategic Triad (bombers, ICBMs,

[100] Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack, *Executive Report* (2004), p. 47.

submarines), other Cold War systems like Looking Glass, ELF, and GWEN having been retired.

- TACAMO E-6Bs, a modified version of the Boeing 707 airliner, are not kept on airborne alert (like Looking Glass during the Cold War), only a few are on strip alert, while most are grounded at Tinker AFB, where they would be sitting ducks in a surprise attack.

The postulated Russian EMP attacks place peak EMP fields (200 kilovolts per meter) on all U.S. strategic nuclear forces and all conventional Global Strike forces, except for submarines at sea. The attack also attempts to neutralize submarines at sea by severing their C3I and connectivity to the National Command Authority. Overlapping EMP fields cause the collapse and protracted blackout of all North America, further crippling U.S. power projection capabilities.

VIII EMP WORLD WAR

A final worst-case scenario would be coordinated EMP attacks by Russia, China, North Korea, and Iran to advance their common global strategic and ideological interests by what would amount to an EMP World War. Is a nuclear world war implausible? Russia apparently does not think so, according to international and Russian press in October 2016:

> *"Russia is holding a massive evacuation drill for more than 40 million people to prepare for nuclear war. More than 200,000 emergency services personnel and soldiers will use 50,000 pieces of equipment during the massive civil defense exercise."*[101]

What are the common strategic and ideological interests of a New Axis comprising Russia, China, North Korea, and Iran?

Strategically, these states are all dissatisfied with the established world order dominated by the United States and its allies. Like Germany before World Wars I and II, they perceive themselves as threatened, victim nations, hemmed in territorially and economically by an international system built by rival powers. Moscow, Beijing, Pyongyang, and Tehran would all like to overthrow the existing world order and replace it with a new world order—dominated by themselves.

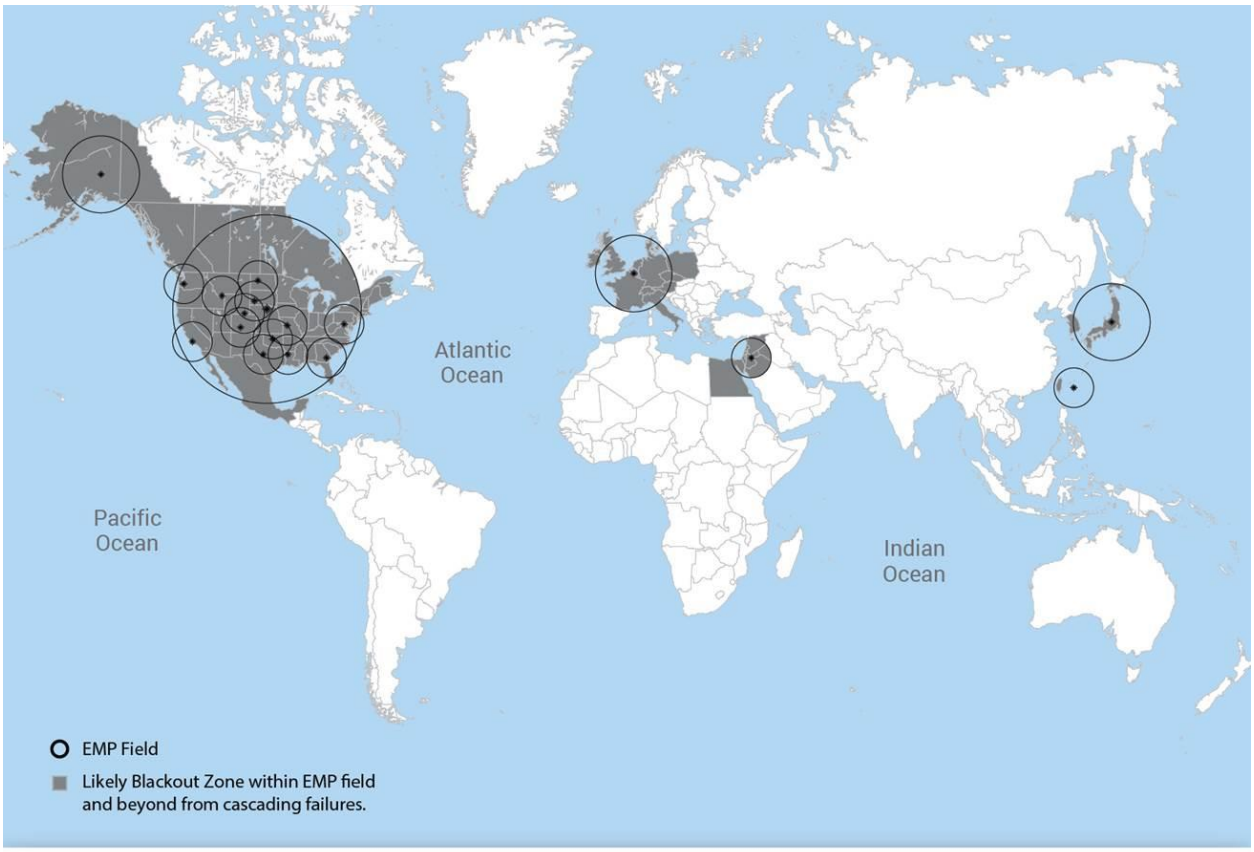
All also see "the world's only superpower" that is the United States as the greatest threat to their existence. No matter how benign the U.S. really is, they do not, perhaps cannot, see anything but that the U.S. is a great potential threat. The New Axis are what might be called "national security states" or "militant dictatorships" because they are obsessed with survival and dominance to the point of sacrificing prosperity. Co-existence might be a temporary necessity. But real security is achieved by dominance, by the annihilation of rivals, a view like that in organized crime. An unsurprising parallel, as these are criminal states.

Ideologically, contrary to common Western assumptions, these "outsider" states do not perceive the United States and the West as necessary to their prosperity, but as impediments actively hostile to their existence. Totalitarian and authoritarian societies see politics and economics, power and wealth, as a zero-sum game. Russia, China, North Korea, and Iran do not blame themselves for their economic and political problems—they blame the U.S. and the West.

Moreover, they fear the free political, economic, and cultural systems represented by the United States and the West, so alien and diametrically opposed to their own totalitarian and authoritarian systems. Like ancient militarist Sparta, in its war with democratic Athens, that made common cause against Athens with all other city states run by tyrants, the elites of Moscow, Beijing, Pyongyang, and Tehran are united by their fear and hatred of freedom.

Evidence is substantial that Russia, China, North Korea, and Iran are tacit allies. Russia and China conduct military exercises together, support each other at the UN, and typically have a

[101] Sam Webb, "Paranoid Putin: Russia Holds Massive Nuclear War Exercise Involving 40 Million People As Military Tensions Rise With U.S." The Sun, October 4, 2016; "40 Million Russians Involved In Annual 4-Day Defense Drills" RT, October 4, 2016.



united front on most international issues. China's new and growing military power is largely built on Russian technology. Russia and China have both helped North Korea and Iran's nuclear and missile programs, and often protect them from sanctions at the UN.[102]

Is it a coincidence that all four of these powers are now embarked on major acts of aggression in Europe, Asia, and the Middle East that challenge international law and the existing world order—simultaneously?

An EMP World War might unfold by sequencing the already described theater EMP scenarios as follows:

- *Iran Strikes Israel* comes first, while Russia, China, and North Korea wait for U.S. forces to concentrate in the Persian Gulf. The U.S. military is now so diminished by cuts in budget, material, and manpower that it can no longer fight more than one big theater war. After perhaps a week, when U.S. forces and crucial C3I assets are committed and en route to the Middle East, simultaneously or in rapid succession:
- North Korea Strikes South Korea and Japan

[102] Bret Stephens thinks Turkey might join Russia, China, and Iran in what he calls "The New Dictators' Club" Wall Street Journal, August 22, 2016.

- China Strikes Taiwan
- Russia Strikes European NATO

Finally, if necessary:

- North Korea Strikes the United States
- Russia Strikes the United States

This sequencing of EMP attacks would maximally exploit the U.S. "hollow" military. Where the U.S. is no longer able to support major military operations in more than one theater, the proposed plan would confront the U.S. nearly simultaneously with an EMP World War in four theaters—in five theaters if the U.S. itself is attacked.[103]

EMP is essentially an anti-technology weapon—and perhaps the perfect "silver bullet" to defeat and humble the high-tech military of the United States that is the basis for its claim to be "the world's only superpower."

Sic Transit Gloria Mundi

[103]According to U.S. Army Chief of Staff Mark Milley "U.S. Military Not Ready To Take On Russia, China, Iran or North Korea" Newsmax, March 17, 2016; Heritage Foundation, 2016 Index Of U.S. Military Strength, Washington, D.C. (2016) also supports what appears to be the consensus view that the U.S. is unprepared for more than one major regional conflict.

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