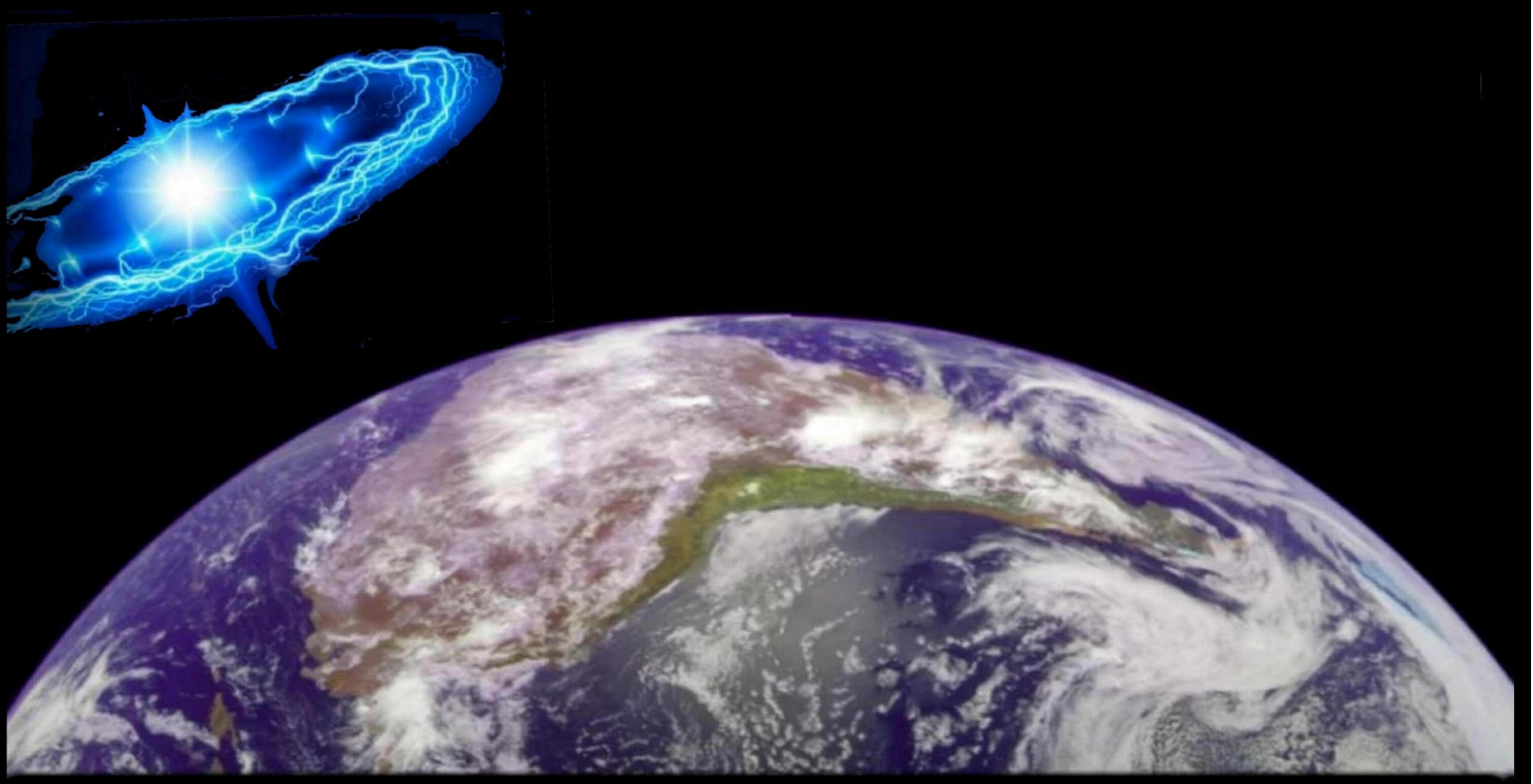

Industrial EMP Solutions

Civilian Critical Infrastructure Protection

A Fresh Look at a 50-Year-Old Unsolved Problem

A high-altitude nuclear explosion (30-400 km) differs significantly from a terrestrial one, since it does not cause such destructive consequences as a terrestrial one and does not directly affect people. That is, it is a non-lethal type of weapon. Why weapons? Because such an explosion initiates an electromagnetic pulse that causes the destruction of electronic and electrical devices over a vast area (thousands of square kilometers). The non-lethality of such weapons makes them very attractive to the military.

High Altitude Electromagnetic Pulse (HEMP) is a quite strange and extraneous phenomenon in the context of both physical processes and informational contradictions. Initially, the phenomenon was detected upon the first nuclear test explosion in 1945 as a side-effect. That side-effect disrupted the registering and the measuring equipment and prevented obtaining numerous important data on the nuclear explosion parameters.

It soon became clear that HEMP (or EMP) was a very powerful weapon. In the United States and the USSR, dozens of experimental high-altitude explosions were carried out and the high effectiveness of such weapons was confirmed. Since then, all military equipment has been EMP protected. The military has been very carefully researching this phenomenon for decades, and all this time the results of the research have been classified.

However, it has been almost 50 years since these studies were declassified and became known to the public. Dozens of companies have sprung up on the market that offer numerous EMP protections means. In such a situation, it would be expected that the civilian critical infrastructure is reliably protected. 50 years is quite a long time for this, but something went wrong...

> *"The problem is not the technology. We know how to protect against it. It's not the money, it doesn't cost that much. The problem is the politics. It always seems to be the politics that gets in the way… The Department of Defense has known for 50 years for how to protect its systems but we never did that for the civilian power grid"*
>
> **Dr. Peter Vincent Pry,**
> **Executive Director of the Task Force on National and Homeland Security**

> *"The U.S. military already has EMP protection approaches that are practical, affordable, tested and well understood that can be translated directly to electric power grid control facilities and supervisory control and data acquisition electronics and networks"*
>
> **Dr. George H. Baker Professor Emeritus,**
> **James Madison University Director, Foundation for Resilient Societies**

This is a great delusion!

Attempts for 50 years to use MILITARY technologies of EMP protection for CIVILIAN critical infrastructure facilities are the main problem and the main reason for the failure to protect the electric power grid and other critical infrastructure facilities!

A new look at the problem and a new strategy in our books:

Industrial EMP Solutions – is a small company with great prospects because our consulting, lectures and our practical developments of EMP protection means are based on a new strategy developed specifically for civil critical infrastructure.

Do you want to know how to protect your equipment?
Do you want to improve the professional level of your staff?
Do you want to get proven EMP protection means for your equipment?

Industrial EMP Solutions - is your experienced and reliable assistant!

Industrial EMP Solutions
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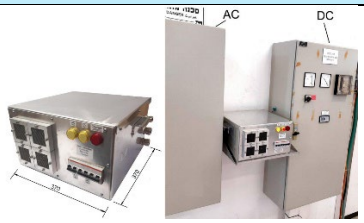
CEO

Dr. Vladimir Gurevich worked for 25 years with the Israel Electric Corporation as a Senior Specialist and Head of section at the Central Electric Laboratory. He personally designed many types of devices and systems for EMP protection of electrical equipment. Now he is the founder and CEO of a private company “Industrial EMP Solutions”. Dr. V. Gurevich has written 16 books, more than 120 patents and more than 200 scientific and technical articles.

HEMP Protection System for High Power Transformer	
	Geomagnetically induced current (GIC) arising from a high-altitude nuclear explosion (component E3 of the HEMP). This is a quasi-direct current, ranging in size from several tens to several hundred Amperes, which leads to saturation of the transformer core, a sharp decrease in its impedance and unacceptable overheating. In addition, there are a bulk of harmonics in the network. This system is designed to protect power transformers with grounded neutral of all power and voltage classes.
Tester for Checking the Operability of the HEMP Protection System of Power Transformers	
	In order to be sure of the serviceability of the protection system of the power transformer, it is necessary to systematically (once a year or once every two years) check it. For simple and convenient performance of such a test, special testers are designed that are connected via a small connector to the sensor of the transformer protection system.
Set of Special HEMP Filters Intended for Control Cabinets with Digital Relay Protection	
	Military electromagnetic filters designed to protect against HEMP are not suitable for use in civilian cabinets with microprocessor-based relay protection for a number of reasons. Therefore, new filters have been developed specifically for civilian critical infrastructure. These filters intended for installation in current and voltage circuits of microprocessor-based protection relays, in control circuits, in auxiliary power supply circuit, and also in grounding circuit (without violating safety requirements).
Backup Power Supply for DC Main Simulation	
	After exposure to HEMP, there is a need to check the serviceability of electronic equipment before actuating. To do this, we need a power supply that simulates a conventional auxiliary DC power system. This compact backup power supply protected from HEMP and is capable of supply up to 25A at 237V. Among other things, such a power supply is very convenient to use when checking, repairing and adjusting the equipment of stations and substations. Such a source is needed in every laboratory, in every substation.
Automatic HEMP Protected Reserve Charger for Auxiliary DC Power Supply System	
	A battery charger for DC auxiliary power supply system of substations and power plants is the most important type of equipment, without which any electronic equipment cannot function normally. To increase the survivability of the DC auxiliary power supply system, an automatic reserve charger protected against HEMP is designed, which starts working when the main standard charger fails and the voltage in this DC network drops below a predetermined threshold. For example, when the voltage drops below 227 V in a DC network with a normal voltage of 237 V.
HEMP Protection Module for Telecommunications	
	Telecommunications are widely used in relay protection systems and other important systems at substations, power plants, and water supply systems. As a rule, it is based on 10 Base-T and 10/100 Base-TX Ethernet (IEEE 802.2). Complex equipment that provides transmission and premium data in such a system contains microprocessors and other electronic chips operating at very low voltages, that is, it is very sensitive to electrical influences. This is the most vulnerable part of the infrastructure, which requires special high-effective HEMP protection. Moreover, such protection should not affect the work of telecommunication. This is just such a module.
Special Means for Backup High Power Diezel Generator Protection	
	The problem of diesel generator (DG) protection from HEMP becomes particularly relevant. First of all, DGs act as backup power sources and are designed to power up critical loads in emergency situations. Consequently, they need to be ready for use even after the HEMP. Secondly, DGs are often stored outdoors (outside of the buildings that can partially mitigate the HEMP impact). Medium-capacity industrial DGs (from dozens to hundreds of kilowatts) are large and heavy devices that are intended for transportation. As a rule, they are confined in a casing with many sensors and microprocessor-based controllers that control the DG's operation

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