

# *Weapons of Mass Disruption*



HERF Guns, EMP Bombs and  
All That Jazz

Winn Schwartau

[WWW.TheSecurityAwarenessCompany.Com](http://WWW.TheSecurityAwarenessCompany.Com)

# *Congress: 1991*

## **Committee Hearings of the US House of Representatives**

### **Committee on Science, Space and Technology**

#### **Subcommittee on Technology and Competitiveness**

- **Mr. Glickman:** Do you think – I hate to get involved in the issue of Gun Control, and this is not a gun in the classic sense. But, do you think that we ought to consider banning these kinds of devices ?
- **Mr. Schwartau:** If you did, you would be banning the microwave and telecommunications industry from its existence. (Laughter)

**June 27, 1991**

# *The Basics*



- Voltage = E (Potential)
- Amperage = I (Current)
- Power = P (Watts)
- Resistance = R (Ohms)

## *More Basics*

- $I = E/R$ 
  - Current = Voltage / Resistance
  - 1 Amp = 500 Volts / 500 Ohms
  - 1ma = 1,000 Volts / 1MegOhm
- $P = I * E$ 
  - Power = Current \* Voltage
  - 1,000 Watts = 10 Amps \* 100 Volts

## *Power Over Time*



- 1 Watt in 1 Second = 1 Watt
  - Continuous
- 1 Watt in 1microsec = 1 MegaWatt
  - Pulse/Spike

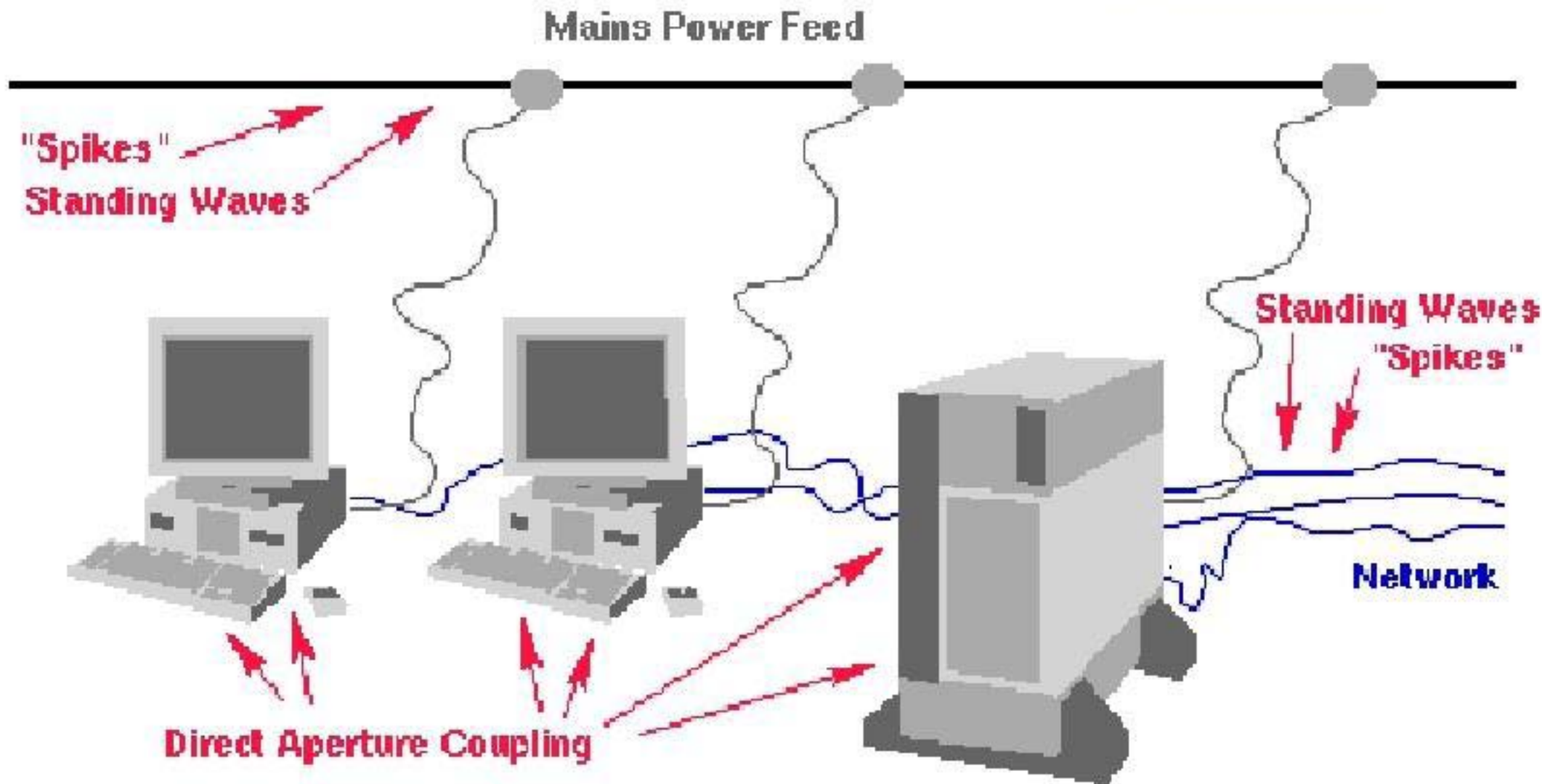


# *HERF Taxonomy*



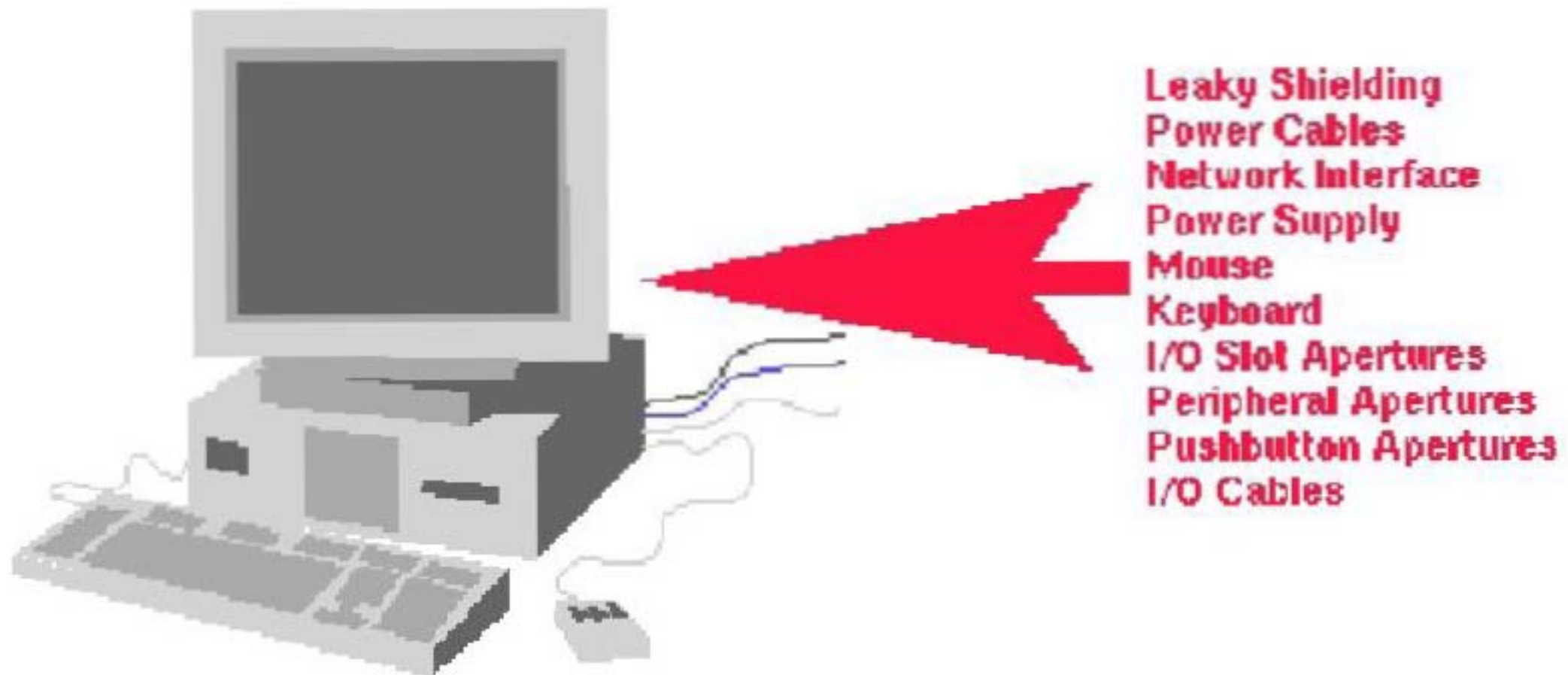
- ESD: Electrostatic Discharge
- EMP: Nuclear & Non-Nuclear
- NB-HPM
- UWB-HPM
- EMI:
- TED
- LERF
- Plasma

# *System Susceptibility*



**Fig.1 System Level Susceptibility**

# *Getting Inside*



**Fig.2 Host Level Susceptibility**



# *ESD*



- Electrostatic Discharge
- Wide Band
- Door Knob Static (Hi-V, Lo-I)
- Lightning (Hi-V, Hi-I)
- Glitch, front end diodes,
- Short distance (Lo-P)
- Unreliable Attack Mechanism

# *Nuclear EMP*



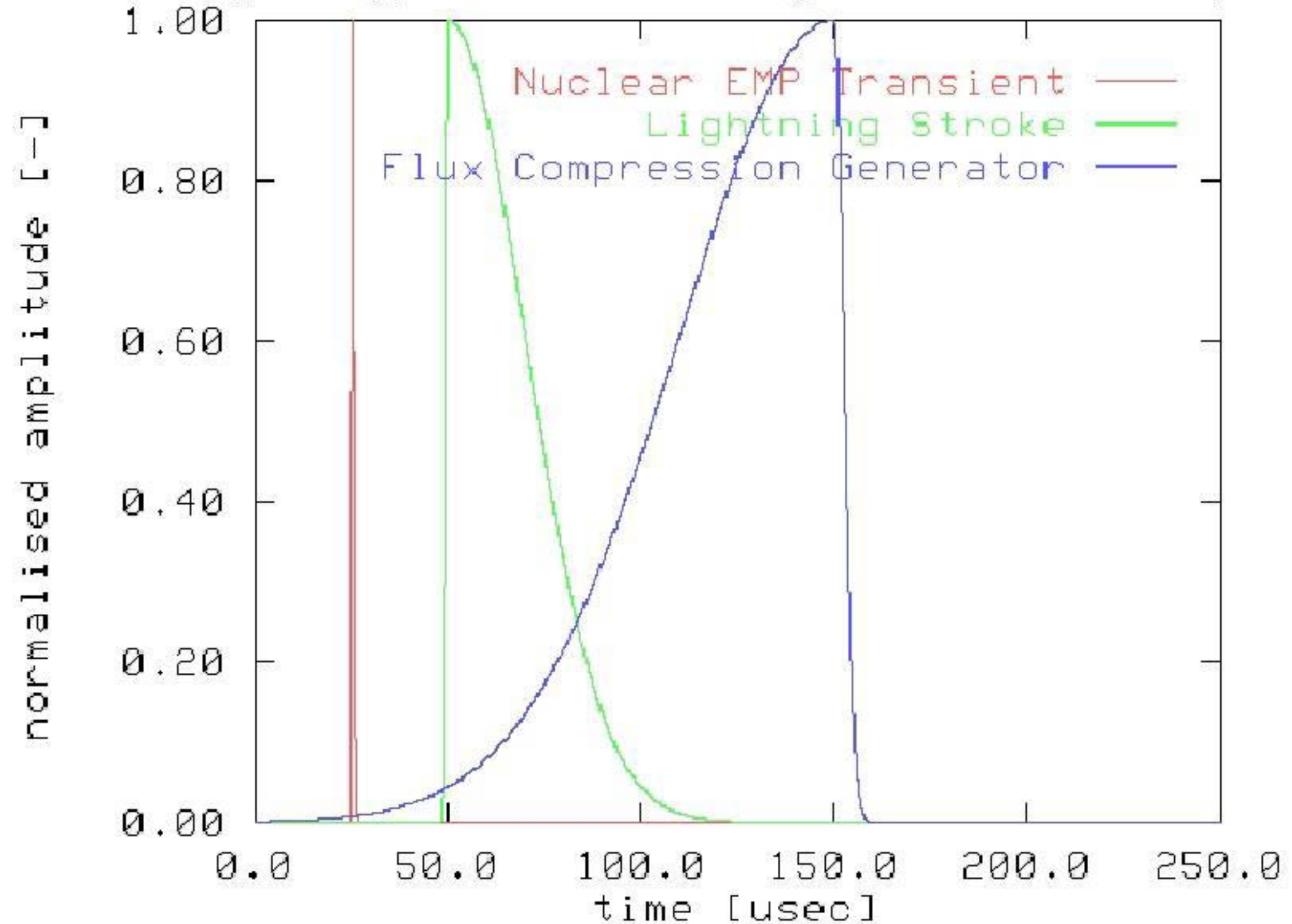
- Electromagnetic Pulse - Nuclear
- Noisy RF Spike from 100KHz to 100MHz
- Blackouts, Comm and Power Failures
- Above Ground Best Results 500-1500m
- TeraWatts
- Over Large Radius: 10+ Miles
- Nation State, Terrorists

# *Non-Nuclear EMP*



- Noisy Wide Band
- Multi-Gigawatts to Terawatts
- Electrical Grid, Communications
- Silicon Meltdown
- Miles of effect
- Explosively Driven
- Nation States, Possible Terrorists

Fig.1 Typical Electromagnetic Pulse Shapes





# Attenuation Factor



Distance From Source/Antenna	Source/Antenna	10 Meters	20 Meters	30 Meters	50 Meters	100 Meters	1000 Meters
% of Source Power Striking Target	100.0%	10.0%	5.0%	3.3%	2.0%	1.0%	0.1%
Volts Per Meter (V/m) Electrical Pressure at Target	1,000,000	100,000	50,000	33,333	20,000	10,000	1,000



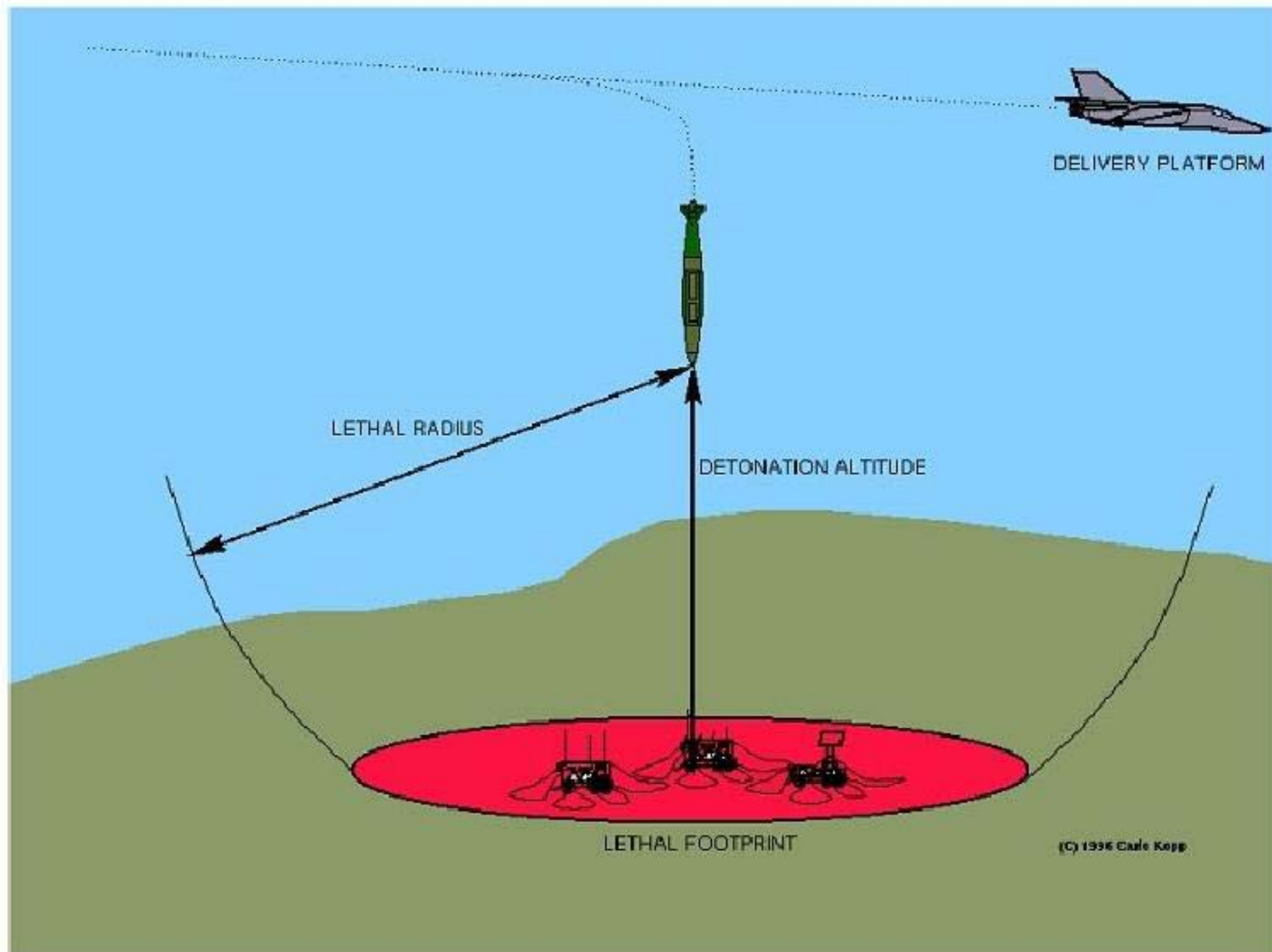
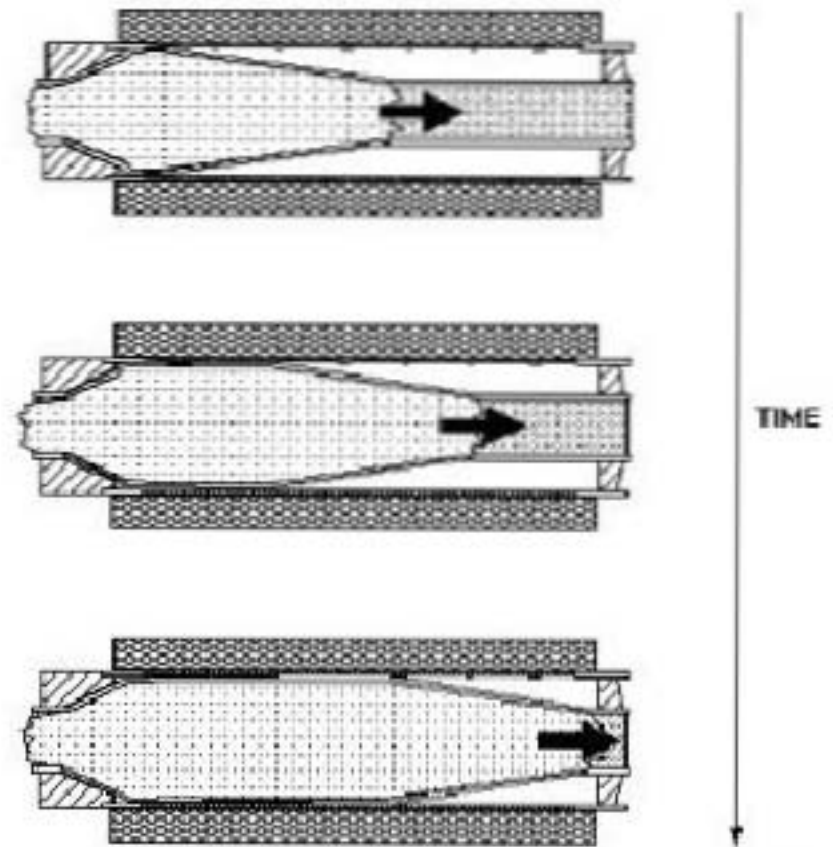
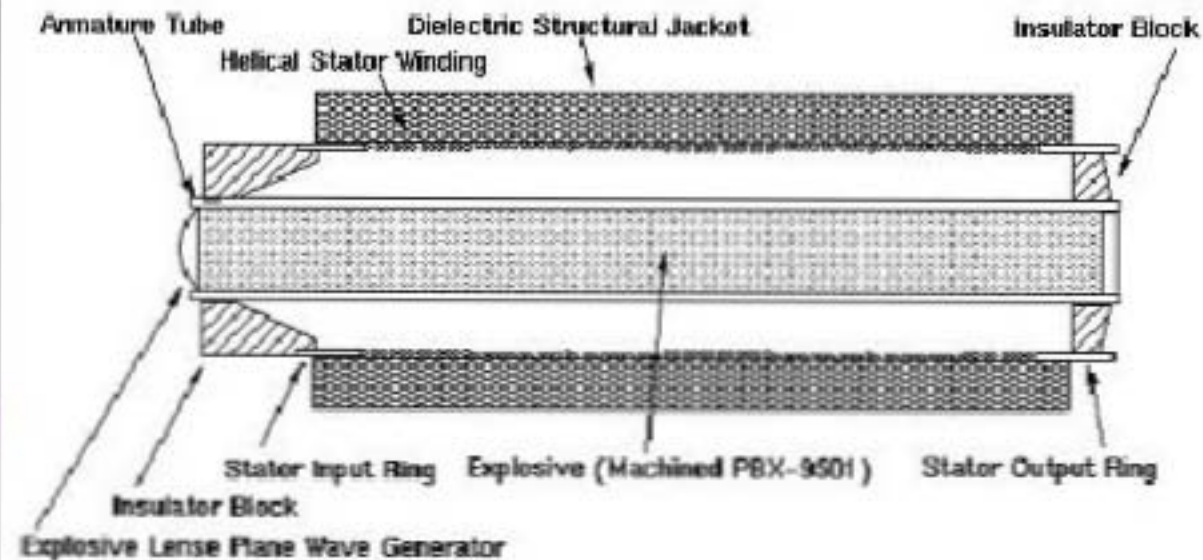


FIG.7 LETHAL FOOTPRINT OF LOW FREQUENCY E- BOMB IN RELATION TO ALTITUDE

# FCG

- Flux Compression Generator
- Explosively Drive
- Magnetic Isolation



(C) 1996 Carlo Kopp

FIG.2 EXPLOSIVELY PUMPED HELICAL FLUX COMPRESSION GENERATOR


## *NB-HPM*



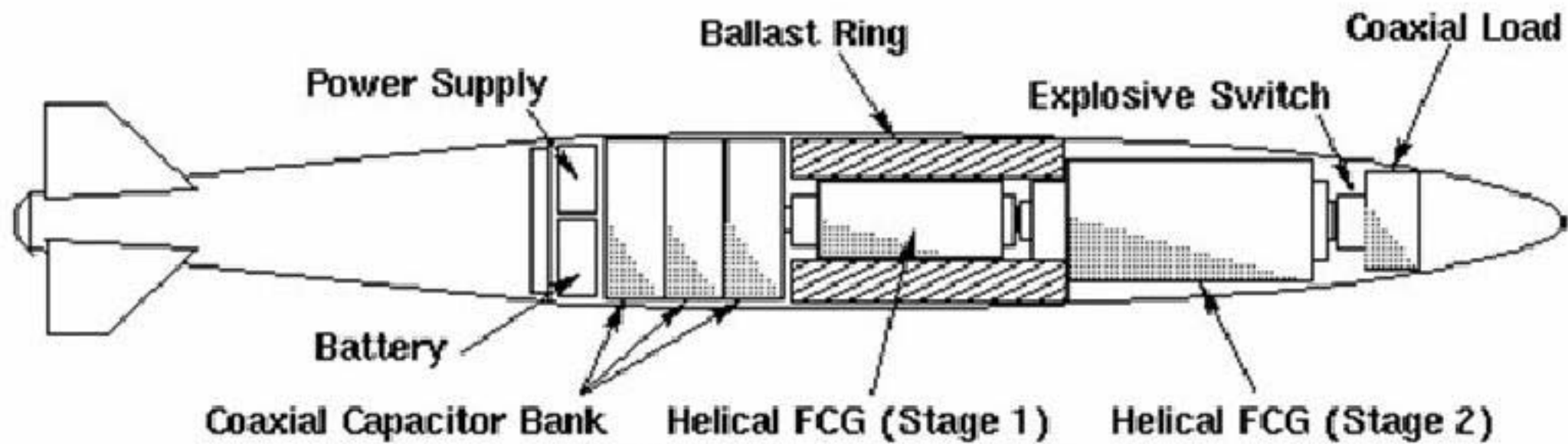
- Narrow Band, Focused Frequency in the Microwave Bands: 1GHz to 100GHz
- Single or Multiple Pulses
- Continuous Duty Cycle: 10-1,000 Watts
- System Disruption to Burnout
- Front Door and Back Door Coupling
- Miles
- Nation States: Used Military Equipment



## *UWB-HPM*



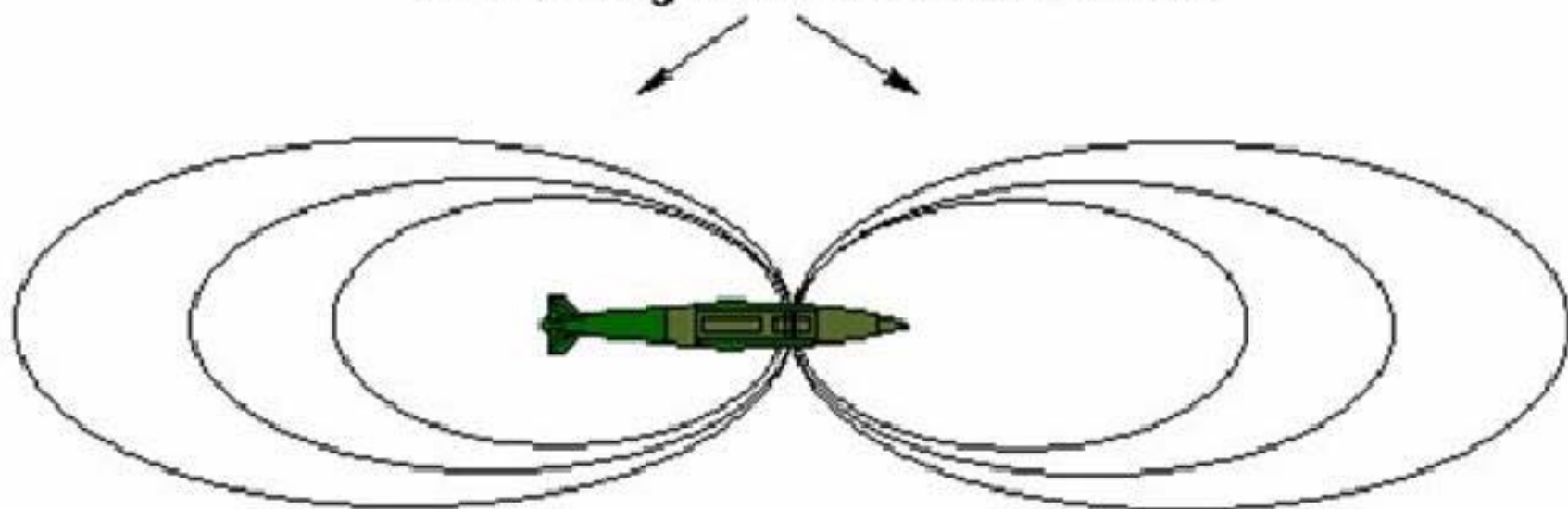
- UltraWide Band HPM
- 100MHz to 30GHz
- PSC - Pulse Swept Continuous
- 1-2ns pulses, 100KW to 100GW
- Used when target freqs are unknown
- Miles
- Requires Advanced Skills



Mk.84 900 kg 3.84 m x 0.46 m dia

# **LOW FREQUENCY E-BOMB - GENERAL ARRANGMENT MK.84 PACKAGING**

FCG Winding Near Field Pattern Lobes



(C) 1996 Carlo Kopp

**FIG.4 LOW FREQUENCY E-BOMB WARHEAD (MK.84 FORM FACTOR)**



# *EMI*



- Electromagnetic Interference
- Sporadic System Problems
- Low Power  $<5W$
- Wide Freq Range, High Harmonics
- Unreliable Attack Mechanism
- Unpredictable
- Part of the Environment

# *LERF*



- Low Energy Radio Frequency
  - EMI Simulation
- Wide spectrum
- Back door and Front door
- Russians
  - Fire
  - Diodes

# *US Military Capabilities*



- Ground Based Anti-Satellite
- Field Deployable
- HERO (Army)
- Back Packs
- Part of Regular Arsenal
- \$500 M Year R&D

# *TED*



- TED: Transient Electrostatic Discharge
- Steep Rise Time, Non Frequency Based
- Single or Multiple Pulses
- Very High Voltage: 1MV
- Terrawatts (Time Domain)
- Ideal for Infrastructure Attacks
- 1Km effects as  $1/D$  Decay
- \$500 To Build

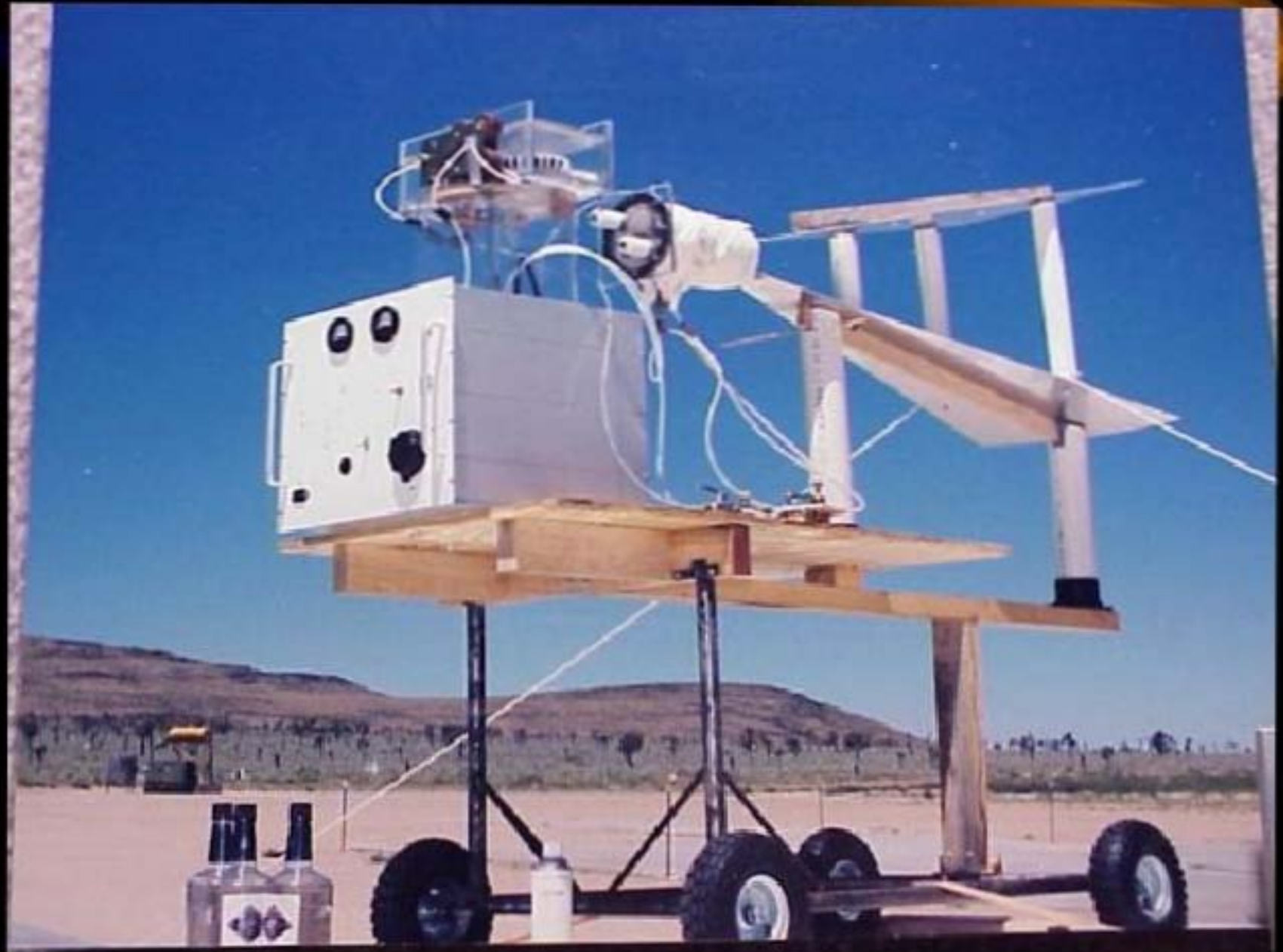


# *Home Made Wave Guide*





*S-20: 500KV, \$500*



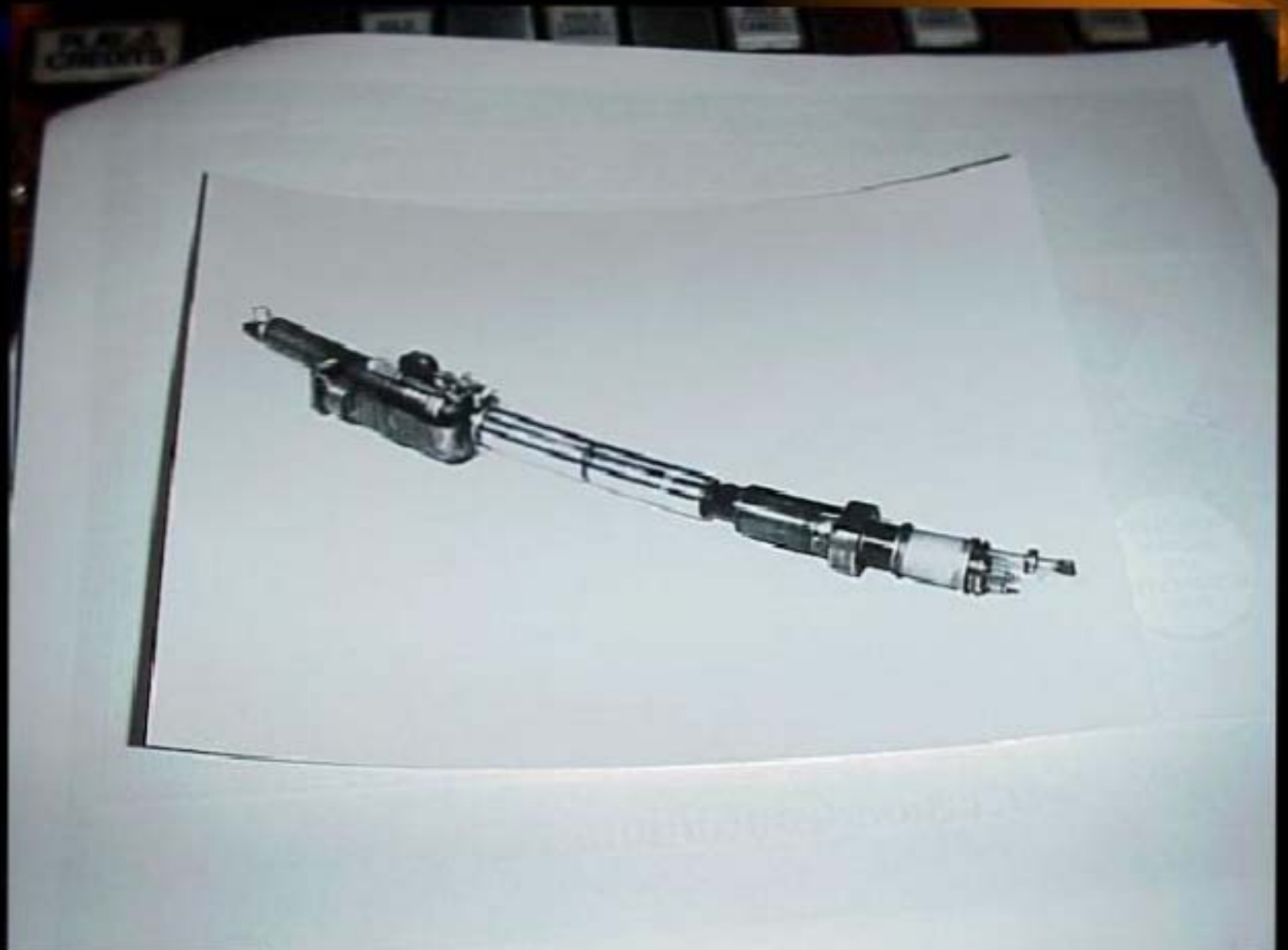


# *The Russians Are Coming*

- They made significant advances in DEW, RF weapons, high power lasers, HPM and pulsed systems
- Magnetically insulated linear oscillators (MILO) are unique HPM power sources
- Neutral particle beam stream generation.
- RADAN: a suitcase-size, 8kg high current electron accelerator providing 2 nanosecond pulses at  $>5\text{MW}$  of power, repeating at 1KHz.
- The NAGIRA system operates at 300MW peak power and 10GHz and was bought by the British Ministry of Defence as a susceptibility evaluation tool.



# *The Russians Are Coming*



## *More Russians*



- : Russian RF weapon for sale on the Internet

- F&D-10-10-1 pulse generator based on new Semi-conductor Fast Ionization Dynistor (FID)
- 10KV, 500A, 1-10 ns Risetime with 100-500 ns Pulse Width and 0-10 kHz Pulse Repetition Frequency. Jitter = 100ps. Size: 310x230x120mm



# *The Russian Car-Stopper*



- Who would buy this weapon from the Internet?
- This device is advertised as a Pulser for “car stopper” prototype.
- 2.5 KV into 50 ohms, Rise time. 700ps, Pulse width 1.7 ns, Jitter , 50ps and Rep rate: 2MHz in burst. Designed for dipping/placement in fluorine for cooling components at high rep rate operation

- Systemic Isolation
- Comprehensive
- Electrical
- A/C
- Faraday Cage

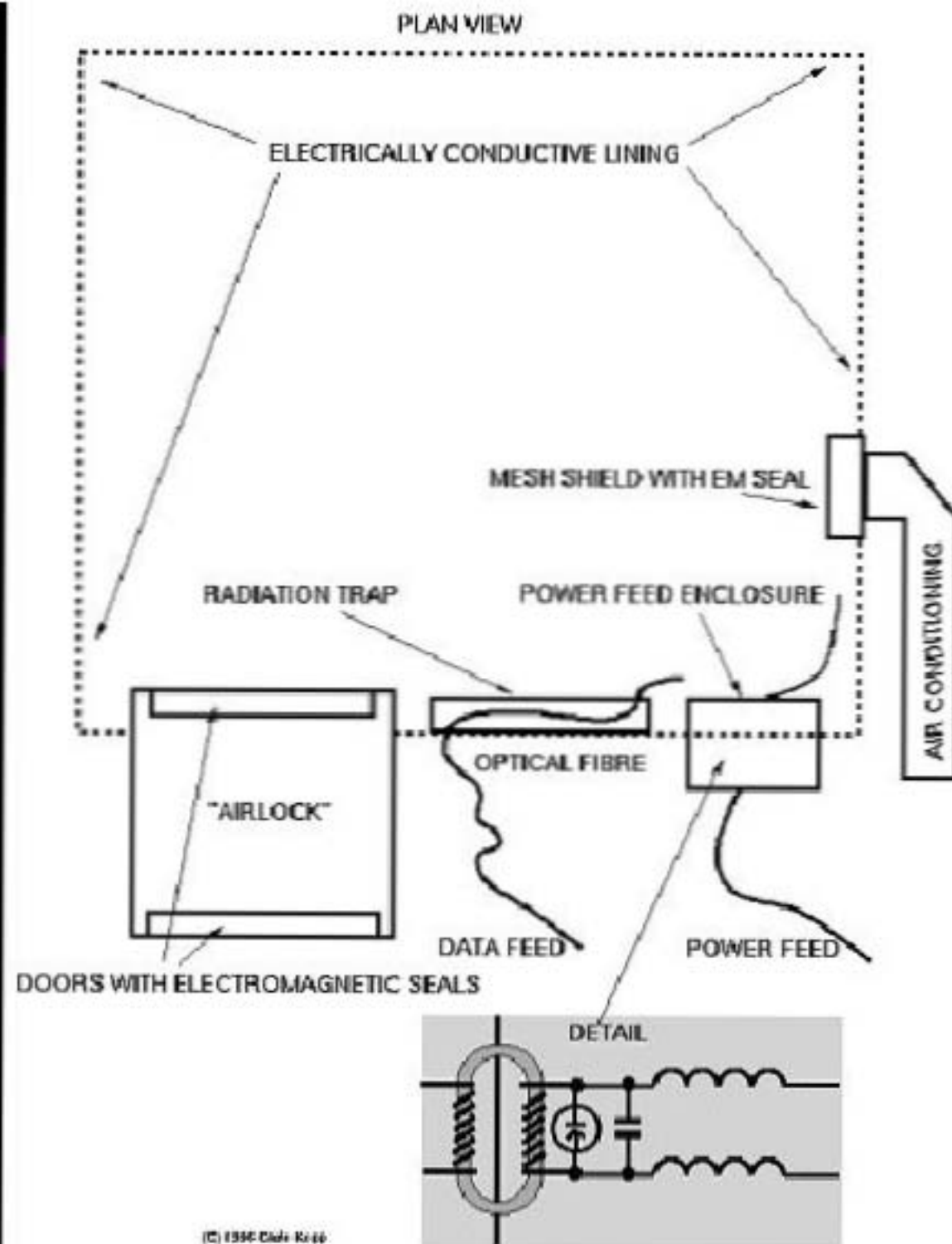
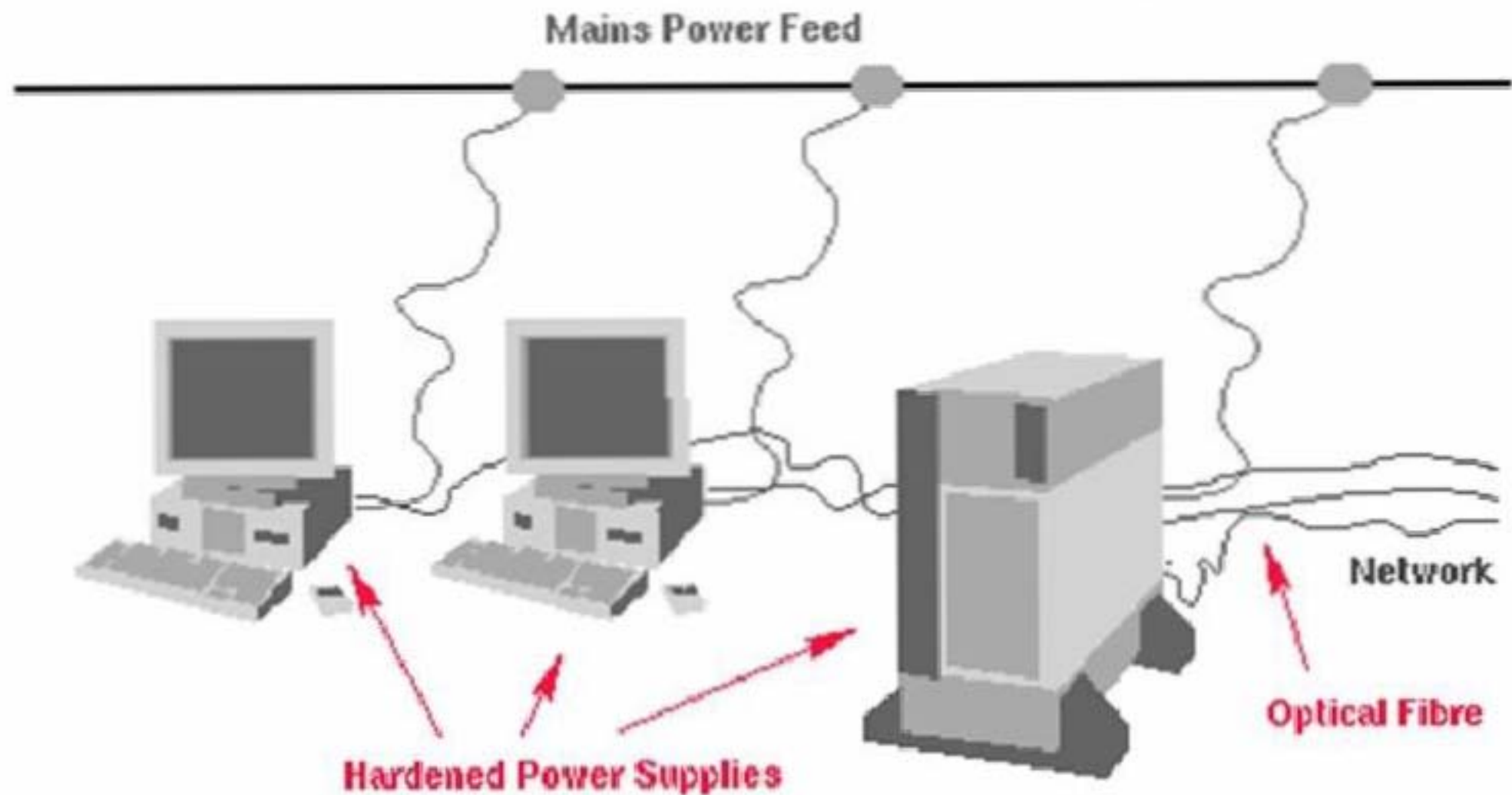


FIG.11 COMPUTER ROOM HARDENED AGAINST EM ATTACK

# *Isolation*



**Fig.3.1 I/O and Power Interface Hardening**

# *Tough to Harden*



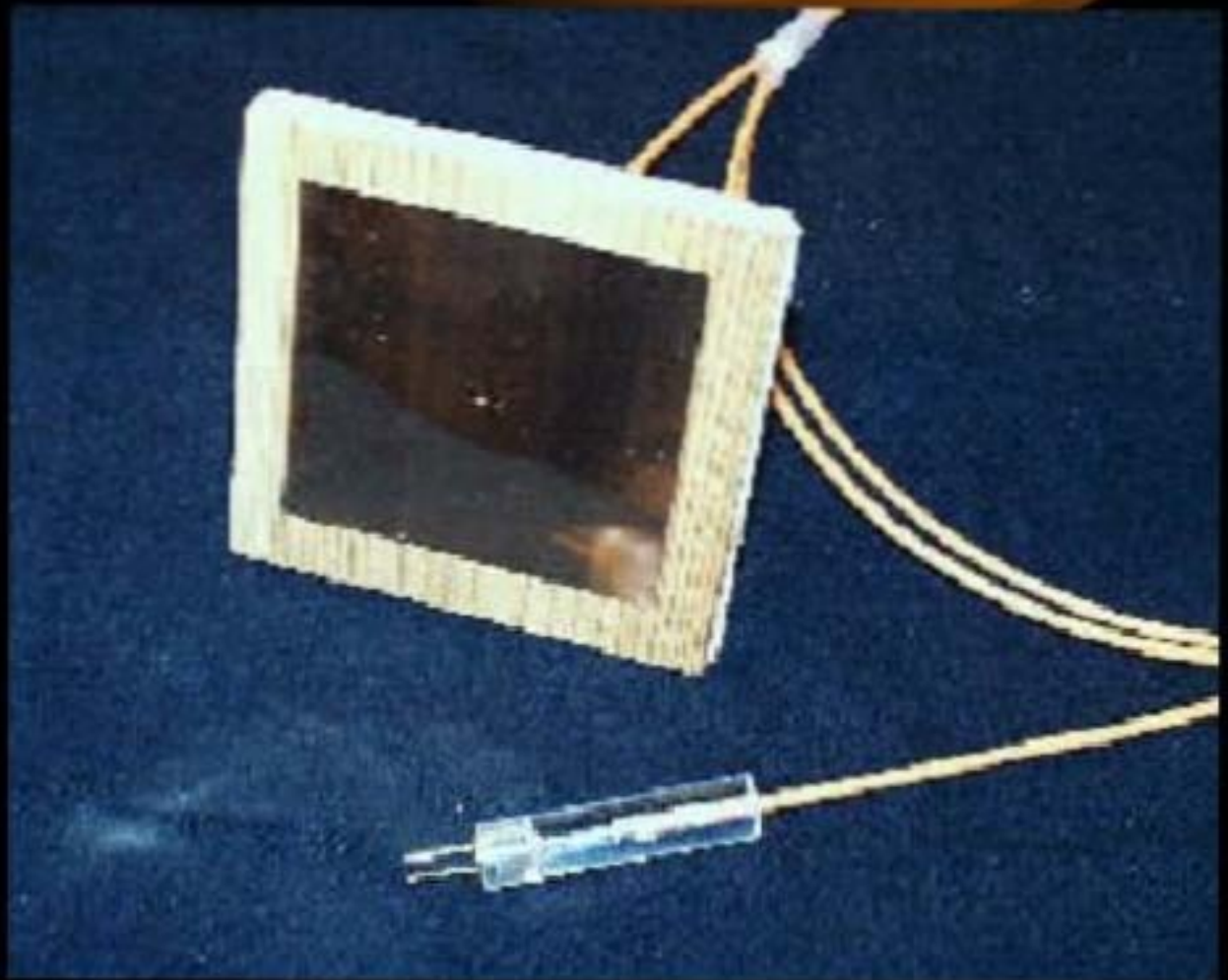
**Comprehensive Shielding  
Ferrite Beads on Power Cables  
Optical Fibre Network Interface  
Non-Electrically Coupled Power  
Optical Mouse  
Optically Coupled Keyboard  
No I/O Slot Apertures  
No Peripheral Apertures  
No Pushbutton Apertures  
I/O Cables**

**Fig.3.2 Comprehensive Host Hardening**



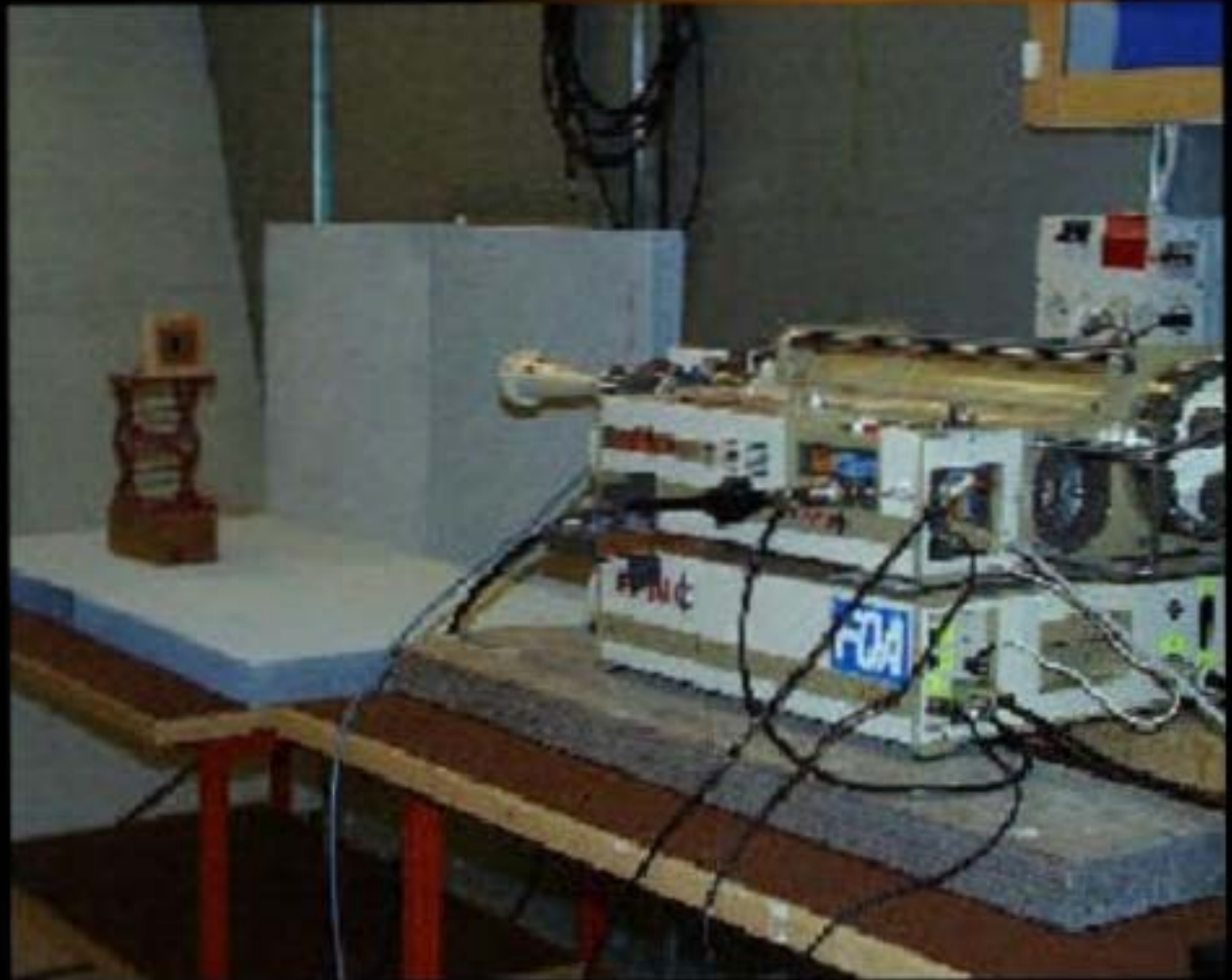
# *HPM/EMP Detector*

- Swedish
- Cooperation
  - Govt/Private
- Finely Tuned
- Very Fast



# *Swedish Test Labs*

High Speed Plasma Limiters



# *China Lake Test Range*





# *Testing Helicopter Susceptibility*





# *Unclassified Hearings*

- 1998 - 1999
- Russian and US Testimony
- Terrorist Concerns



**JOINT ECONOMIC COMMITTEE HEARING**

**RADIO FREQUENCY WEAPONS AND PROLIFERATION:  
POTENTIAL IMPACT ON THE ECONOMY**

# *Health Concerns*



- Poodle in the Microwave
- Klysteron
- LERF
  - Alleged
- ESD/TED
  - Unknown
- Watch Your Genitals & Brain

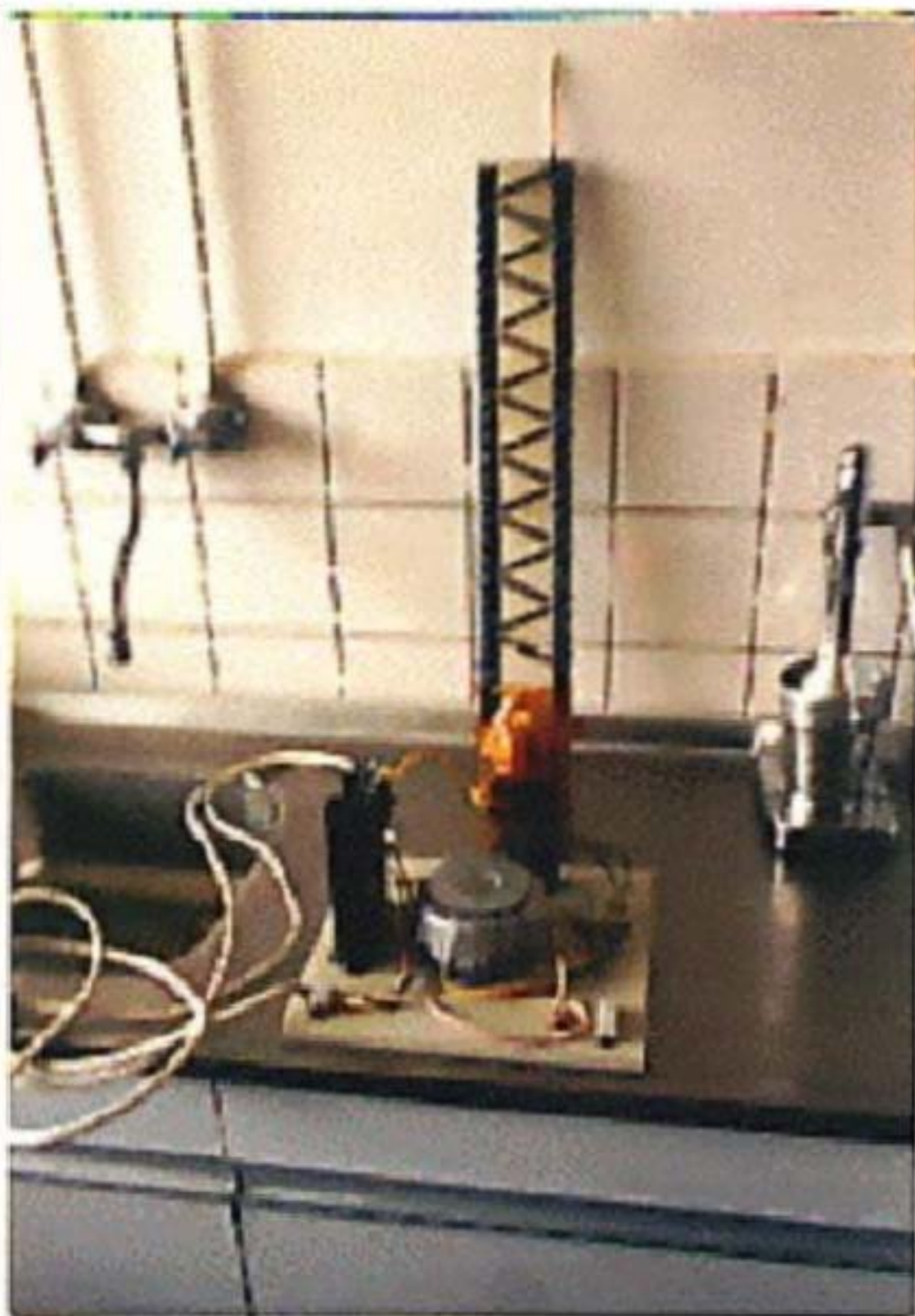
# Tesla

- Hi-V
  - $>1\text{MV}$
- Lo-I
  - $<1\text{ma}$
- Lo-P





- Haptic, 1991





# *Home Brew Models*



- Marx Generators
- Spark Plugs
- The Coffin
- Capacitive Discharge
- Low Danger to Play

*Slava*

- 19 Year Old Russian Student, SUNY
- Bouncing Soda Cans
- 151 Foot Disable PC
- 5 Different Models That Work
- [www.voltsamps.com](http://www.voltsamps.com)



<http://www.voltsamps.com>



High voltage layer

Cascade

MMC

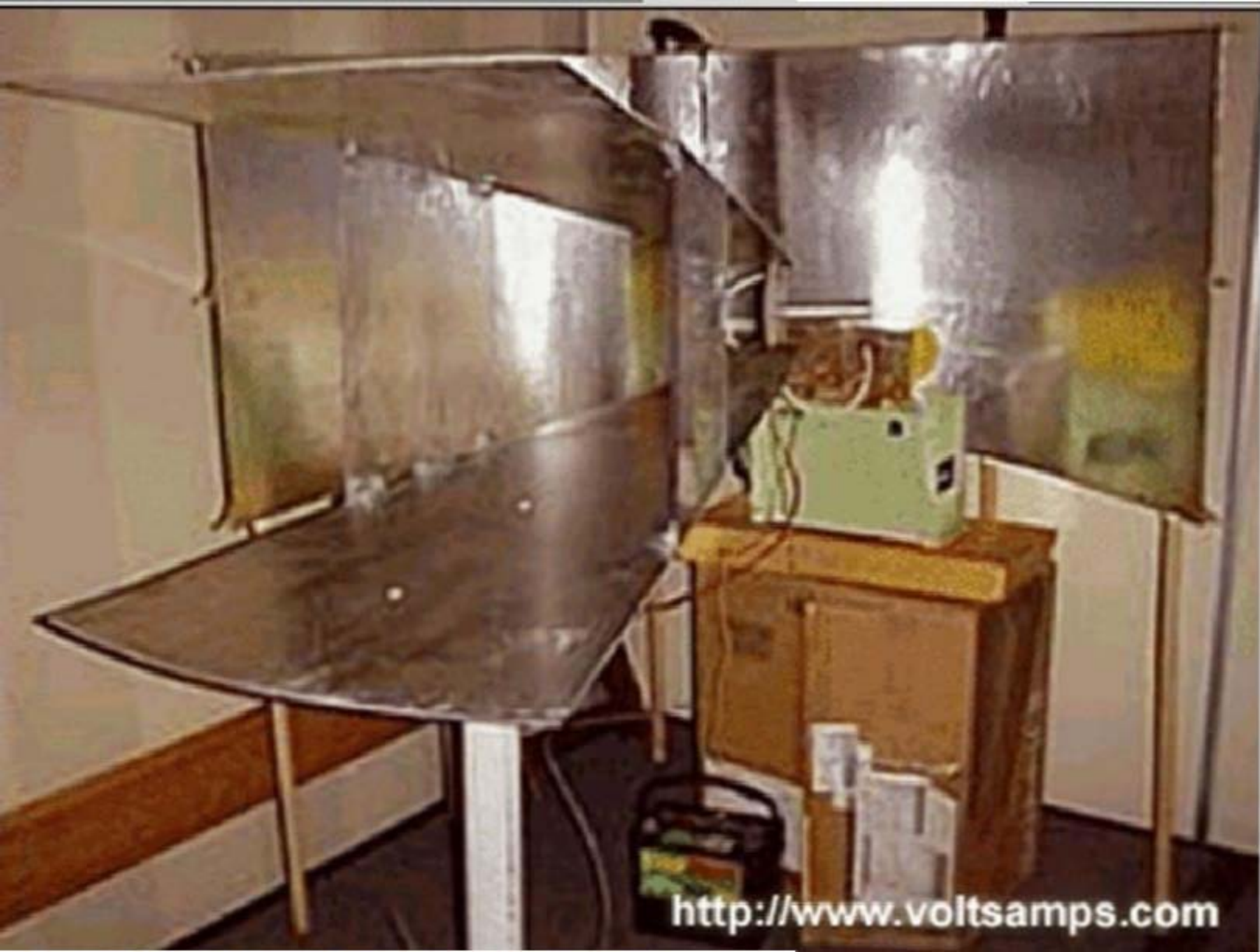
3V photo cell

DC-to-DC Inverter

<http://www.voltsamps.com>







<http://www.voltsamps.com>



### **NEW! Jacobs Ladder-**

Seen in many mad scientist laboratories. Starts off as a 1/4" arc and expands to over 3" before disappearing into the air and starting again. Demonstrates unique effect of traveling plasma. A great display project.

**#JACO Plans—\$5.00**



### **Tesla Coil-**

Duplicate Nikola Tesla's wireless transmission of power experiments. Produces high frequency high-voltage output capable of lighting lights in vicinity of device by no apparent means.

**#TESL Booklet—\$10.00**



### **Winhurst Machine-**

Produce over 75,000 volts from a simple to build hand cranked device. Creates static charge by induction. A cousin of the Van de Graff generator.

**#WIMH Plans—\$7.00**



### **Van de Graff generator-**

Very high voltages are produced by repeated contact and separation of dissimilar substances also know as friction. Build your own.

**#VAND Plans—\$7.00**

**#VANX Kit/Plans—\$80.00**

- The hobbyist can play around with blowing his friends and neighbors out of electronic existence and hopefully protecting his reproductive organs at the same time. If you must, go to <http://www.futurehorizons.net/energy/high.htm> for all of the exciting details.



# Additional Research

- Thanks to Karlo Copp for permission to use some of his artwork.
- *Information Warfare: Chaos on the Electronic Superhighway* : Winn Schwartau, ISBN: 1-56025-080-1
- *Information Warfare, 2<sup>nd</sup>. Edition*: Winn Schwartau, ISBN: 1-56025-0132-8
- [www.infowar.com](http://www.infowar.com)
- *Time Based Security*: Winn Schwartau, ISBN: 0-9628700-4-8
- [www.abc.com](http://www.abc.com)
- Sweden's efforts in HERF: [www.emc.se](http://www.emc.se), [www.foa.se](http://www.foa.se)
- For Tesla and high voltage hobbyists, check out <http://www.futurehorizons.net/energy/high.htm> )
- *"The Body Electric"* by Dr. Robert Becker, 1985: ISBN?
- US Patent # 5,856,803, Ed Pevlar
- [www.emf-emi.com](http://www.emf-emi.com) Don White is one of the industries premier experts in EMI
- [www.cs.monash.edu.au/~carlo/](http://www.cs.monash.edu.au/~carlo/) is the product of researcher Carlo Kopp.
- The Congressional hearings on RF Weapons with links to related testimony:  
[www.house.gov/jec/hearings/05-20-8h.html](http://www.house.gov/jec/hearings/05-20-8h.html)
- Testimony of former KGB Major Victor Sheymov to Congress:  
[www.house.gov/jec/hearings/intell/sheymov.htm](http://www.house.gov/jec/hearings/intell/sheymov.htm)
- Lt. Gen. Robert Schweitzer's testimony on RF Weapons:  
[www.house.gov/jec/hearings/espionag/schweitz.htm](http://www.house.gov/jec/hearings/espionag/schweitz.htm)
- To see what Russian RF goodies are available on the open market, check out [www.moose-hill.com](http://www.moose-hill.com)

# *Questions?*



- Answers
- Responses
- Made Up Stuff

•

THANKS!