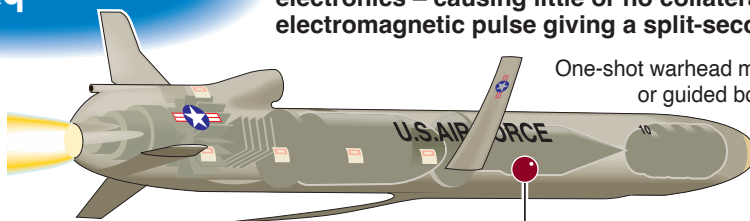


# Microwave weapons aimed at Iraq

## Ultra-wideband (UWB) e-bomb

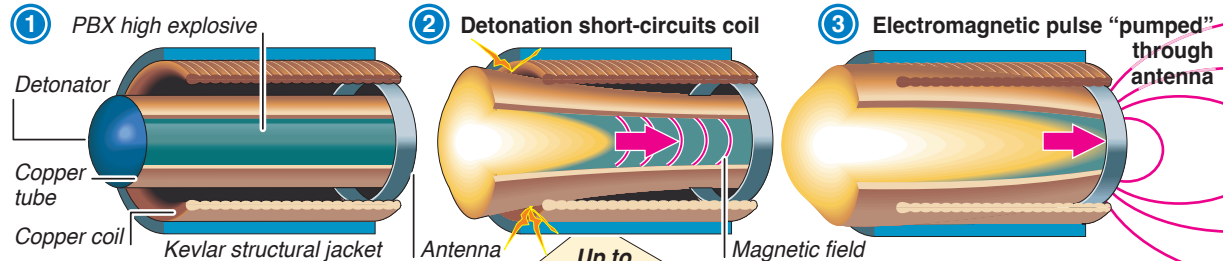
Single pulse device, covering 10MHz to 2GHz frequencies



One-shot warhead mounted on cruise missile or guided bomb for accurate delivery

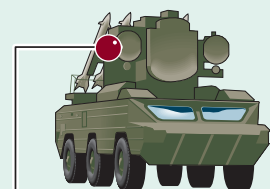
AGM-86 air-launched cruise missile

## Flux Compression Generator (FCG)



## Prime targets

Command and control centres,  
Power and telecoms infrastructure,  
Chemical or biological  
weapon production facilities,  
Fixed and mobile air defence



## "Front-door" coupling

Communications or radar antenna – designed to pick up radio waves – are most efficient entry point

## Telecommunications

Copper wires vulnerable, but fibre-optics immune to RF (radio frequency) disruption

## High-power microwave (HPM) weapon

Focuses power on single frequency between 1GHz-100GHz to target specific vulnerable equipment. Mounted in C-130 transport aircraft or Unmanned Combat Aerial Vehicle

## Power supply e.g. Marx generator

Bank of capacitors stores electrical charge. Size limits weapon range

Super-fast switches release charge in 300 picosecond burst of up to 20GW

## Microwave tube e.g. Klystron

Charge generates microwaves

## Parabolic antenna

Directs waves to intended target

Electron beam

Generating cavities

Coil

Beam radius 15m

## Newer is better?

As electronic components have reduced in size, they have become more sensitive, ironically making the U.S. – with its dependence on the microchip – most vulnerable

## Shielded bunker

Even metal Faraday Cage shelter can be breached by very high-frequency microwaves via vents, and gaps in panels. Even hardened silicon carbide circuits have critical threshold

## "Back-door" coupling

Utilities cables and pipes can act as antennas, carrying pulse into heart of shelter

## Late-effect EMP

In first 15 minutes, initial pulse creates localized magnetic fields which collapse to cause secondary surges