



Checking your pulse

An often forgotten issue that is relevant to all electronic equipment is the threat of an electromagnetic pulse (EMP) or electromagnetic interference (EMI). Whether digital systems are in a building or on vehicles, naval vessels or aircraft, they need protection.

EMPs can result from natural occurrences like a solar storm, or through the intentional explosion of a device, which can emit a high-frequency EMP (HEMP).

An EMP can take the form of radiated or conducted emissions, and the effect it has depends on the power and direction of the pulse and materials of the building or location that are its target. A radiated pulse requires a lot of power, whereas a conducted emission is done through cables.

Emissions radiated through the air can be protected against using a Faraday cage, a steel mesh case with filters that can protect whatever decibel requirement is needed.

A conducted EMP is cheaper to generate, and because electronic systems need power and are connected to their supply using cables and connectors, it represents a higher threat. Cables act as antennas and an EMP can run along these directly into all the devices that are hooked up, causing immense damage.

Paul Currie, from counter-EMP/EMI specialists MPE, said that pulses will travel along the wires and that to prevent this from happening filters are the usual method of protection.

The defence market for such EMP filters is huge, with this kind of equipment being installed on platforms such as submarines and ships which have EW rooms that need protecting, as well as aircraft. They are also used by special forces units.

Currie told *Digital Battlespace* that, at the moment, the EMI threat is at the 'level of a

computer hacker', ie someone causing trouble for the hell of it and in an opportunistic manner. He said that 'low-technology devices' like a microwave or something that fits into a suitcase could be carried into a sensitive area, or connect to a cable on the roadside and affect computers or a communications network, military or civil.

Whilst some buildings are protected against EMI, the kerbside is not and this is the way that an EMP can get in. Ships moored in port face the same threats, as do aircraft on the ground. It is a cheap way of causing a lot of damage and does not require a large amount of power.

At fixed installations where a lot of power is used, all this goes through HEMP filters built to meet military standards. For vehicles there are feed-through capacitors mounted on the chassis so that this noise (vibration) is routed down and out through the frame to the ground.

This is important because even something like an air conditioning system fitted in a vehicle cab, if it is near communications equipment and in a similar band, will interfere. Using inductors and capacitors, this noise can be stripped out.

An electrical signal can have different effects – visible and non-visible. Instead of taking out a system completely and making it obvious to a user that there is a problem it, could just degrade it – for example, reducing the effective range of a communications system from 2km to 1.5km.

Therefore the next step is detection. There needs to be more research into what EMI looks like to identify if an EMP has been generated and allow for an informed response. For the time being, watch this space...

Tim Fish, Editor

RESPONSE

Digital Battlespace's editorial team is always happy to receive comments on its articles and to hear readers' views on the issues raised in the magazine. Contact details can be found on p1.

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