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MPE 90th Anniversary 1925 – 2015

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Issue 7

MPE PEOPLE

NVQ projects make a real difference to trainees & shopfloor

Following hard on the heels of the first group of employees detailed in Issue 3 of the Company Bulletin, six further members of the MPE team, pictured here, have just successfully achieved their Level 2 NVQ (National Vocational Qualification) in Business Improvement Techniques.

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Spotlight on Will Turner

Will Turner joined MPE in March 2010 as a Design Engineer, designing and developing bespoke EMC and EMP filtering solutions for a wide range of industries and applications. Then, from December 2012 as the Senior Design Engineer at the company, he now provides a focal point for all technical enquiries, new product design, third-line support and engineering-related processes.

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MPE TECHNOLOGY

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The IEMI threat & a practical response

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MPE DISTRIBUTOR NEWS

MPE filters are flying high with Ampere in Italy

MPE's distributor in Italy is Ampere, a family-owned business established in 1940. The company's main activities are the sales and distribution of instruments and systems for electrical measurement and test as well as EMC compliance products, whilst also offering in-house electronic laboratory services, site installations, commissioning and repair services to customers across Italy and beyond.

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Supporting Radiotechnika at MSPO in Kielce

From 1st to 4th September the Kielce Exhibition and Congress Centre in central Poland was the impressive stage for the 23rd annual International Defence Industry Exhibition MSPO and the 21st International Logistics Fair Logistyka. MPE were present on the stand of their Polish distributor Radiotechnika, showing a full range of MPE products including a four-socket pluggable TEMPEST filter functioning throughout the event.

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MPE APPLICATIONS

MPE powerline filters safeguard longrange air defence radar system

The established Ground Master 400 (GM400) from Thales Raytheon Systems is a 3D longrange air defence radar. It tracks a wide range of targets – from highly manoeuvrable tactical aircraft flying below several hundred feet to the unconventional device with small radar signature such as UAVs or short-range missiles.

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Custom EMC filter lights up the green energy market

TerOpta Ltd has been developing the TeroLight intelligent lighting system for a number of years. The system is based upon independent marshalling boxes being used to control different elements or circuits within buildings, with communications between them using mains-borne signalling. To ensure signal integrity and high system performance, mains-borne noise and interference need to be removed from the system.

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FAST FACTS ON MPE LTD

- MPE has traded since 1925 and employs over 50 people.
- MPE has designed, manufactured and shipped in excess of 8,000,000 high-performance EMC, EMP and TEMPEST filters and feedthrough capacitors in the last 30 years.
- Many products have been in service for more than 20 years with undiminished performance.
- MPE has a portfolio of over 20,000 custom product designs to meet all possible requirements.
- The MPE factory at Knowsley, Liverpool, is certified to the quality standard ISO 9001:2015, and its products meet all applicable defence standards.

For comprehensive information about MPE's products and services, contact the Sales and Marketing Department, MPE Ltd, Hammond Road, Knowsley Industrial Park, Liverpool, L33 7UL, U.K. Tel +44 (0)151 632 9100. Fax +44 (0)151 632 9112.
Email sales@mpe.co.uk. Website www.mpe.co.uk

If you have a friend or colleague who you think might find the MPE Company Bulletin informative, then why not forward it to them?

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NVQ projects make a real difference to trainees & to the shopfloor

Pictured here from left to right proudly holding their NVQ certificates are: John Lindsay, Mike Kelly, Will Turner, Steve Madden, Rob Hewitt and Robbie Radford

Following hard on the heels of the first group of employees detailed in Issue 3 of the *Company Bulletin*, six further members of the MPE team, pictured here, have just successfully achieved their Level 2 NVQ (National Vocational Qualification) in Business Improvement Techniques. Following the same mix of practical and theoretical sessions, the training course was again conducted by the NVQ trainer and assessor Gary Combs of GT Innovations Ltd.

Importance was placed on the six employees being a cross-functional team from different departments within MPE. The individuals were John Lindsay – Production Engineering, Mike Kelly – Production Assembly, Will Turner – Engineering, Steve Madden – Production, Rob Hewitt – Sales and Robbie Radford – Fabrication.

As part of the training course, the team had to work on actual “live” projects on the shopfloor, and the main stores and dispatch area were selected this time. As a result, the layout, ergonomics and appearance of these key working areas were rationalised and refreshed. That served to ensure adherence to all Health and Safety recommendations and greater efficiency in picking materials and kitting jobs for production. As well as improvements in floorspace utilisation and set-up time, the projects also created far better access to the packing and dispatch areas, essential as MPE continues to ship in ever higher volumes.

The benefit to the individuals was not only the attainment of a recognised NVQ, but also an opportunity to experience areas

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of the MPE business beyond their normal responsibilities. NVQ trainer Gary Combs commented: “I was delighted for GT Innovations to be re-engaged to provide business improvement technique training and assessing services for an additional team at MPE. When starting with a new team, I always emphasise a need for three things from the candidates – open minds, a willingness to contribute, and for them to bring their many years of experience to the course and improvement projects at hand. Teams at MPE give me these in abundance.

“It was great to see the latest team not only propose and justify improvements that needed MPE’s Board-level approval, but ones that would impact on the back office processes in addition to production. With full Board endorsement the team undertook several projects. They reorganised the test area for better quality performance, rationalised and improved document storage to speed up access for shopfloor and back office processes, and finally improved the layout and access of the main stores for safety and speed of stock location.”

The main stores and dispatch area at MPE before and after improvements were undertaken via the NVQ project

Stores Area - Before

Stores Area - Before

Stores Storage - After

Stores Storage - Before

Capacitor Winding Shop - Before

Capacitor Winding Shop - After

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Will Turner

Spotlight on Will Turner

Will Turner joined MPE in March 2010 as a Design Engineer, designing and developing bespoke EMC and EMP filtering solutions for a wide range of industries and applications. He interfaced with customers and suppliers on new products, legacy component support and quality matters. He also instigated a cross-departmental project which spearheaded enhancements to the company's MRP system.

Then, from December 2012 as the Senior Design Engineer at the company, he now provides a focal point for all technical enquiries, new product design, third-line support and engineering-related processes.

Among his accomplishments in introducing a number of new and innovative MPE filters, he led a team of engineers in the design and development of the ground-breaking 1200A HEMP filter.

Since December 2012 he has been working alongside the Technical Director of MPE, Jan Nalborczyk. Like Jan, Will Turner is now a Committee Member of the BSI (British Standards Institution), representing the UK on international standards committees. This involves in particular the IEC (International Electrotechnical Commission) SC77C Committee concerned with standardisation in the field of EMC to protect civilian equipment, systems and installations from threats by man-made, high-power transient phenomena, including the electromagnetic fields produced by nuclear detonations at high altitude.

Accordingly, on the SC77C Committee Will is working on the new IEC/EN 61000-5-10 ("Guide to the Application of HEMP and IEMI Publications"), and updates to IEC/EN 61000-4-24 ("Test Methods for Protective Devices for HEMP Conducted Disturbance").

Then, at the 2015 EMC UK Conference, 6th to 7th October at Newbury Racecourse, he presented a technical paper on Intentional EMI "The IEMI Threat and a Practical Response", reproduced in the article below. This followed a paper on the long-term reliability of powerline filters in EMP protection systems, which he delivered at the 2012 EMC UK Conference at the same venue. Later on, his presentation to the 2014 American Electromagnetics Conference (AMEREM) in Albuquerque, New Mexico, was on "The Design of High-Current HEMP Filters for Reliability".

After graduating from the University of Birmingham in 2003 with an MEng Honours degree in Electronic and Electrical Engineering, Will Turner was employed installing radiocommunications systems for remote CCTV on the London Docklands Light Railway. His responsibilities centered on the practicalities of installing and commissioning new wifi antenna, communications and power equipment, integrated into existing trackside systems.

From 2004 to 2010, Will was Hardware Design Engineer at Fujitsu Telecommunications Europe in Birmingham. He began there as a

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Digital designer – focused on access nodes for BT's 21CN (21st Century Network) project – before moving on to Fujitsu's Physical design team. In that period he was engaged on street cabinet space and thermal planning and cable schemes for Saudi Arabia and BT's Fibre To The Curb (FTTC) – the products that enabled the roll-out of BT Infinity high-speed broadband – as well as the latest exchange-based, high-density copper/fibre cross-connect cabinets.

An active member of the Institution of Engineering and Technology, Will was originally from County Durham, where he went to school and was a keen rugby union player for 11 years. He now lives at St Helens, Merseyside, with his partner and young son. His outside interests currently include the challenge of restoring classic cars – he is working lovingly on an MG Midget which he plans to take on track days and charity rallies next year.

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Examples of MPE filtered connectors with Radsok interface

Manufacturing military connectors with integral EMC suppression

Following on from our article in Issue 6 of the MPE newsletter reporting on the techniques MPE have developed which enable the capacitor to be wound into the backshell of high-power military connectors, MPE is now actively manufacturing prototype connectors that demonstrate this capability.

Many types of high-current connectors are available in the defence marketplace which provide mechanical compliance to MIL-DTL-38999 Series III on a variety of connector interface platforms. Products come from a wide range of established manufacturers – Amphenol, Glenair, ODU, Polamco and Smiths to name but a few.

So, whilst potentially EMC suppression can be provided by MPE on any of those connectors, to demonstrate the technique in practice MPE has manufactured a range using the Amphenol connector on the Radsok® platform. Radsok has been selected to demonstrate the concept, and manufacture is not restricted at all to that specific electrical contact interface.

The demonstration range includes both AC and DC feedthrough capacitors designed to interface to Amphenol Radsok connectors. The products are suitable for all high-performance applications requiring high reliability coupled with good high-frequency performance – such as mains power supplies for servers, communications base stations, switches and of course military vehicle platforms.

Defence vehicles, as previously reported, generally have separate power connectors and EMC filters, which together take up too much valuable space and add weight. Now integrating the required EMC suppression for the first time ever into high-power connectors themselves, the special MPE solution allows the capacitor to be wound into the backshell, where the greater the space for windings, the greater the EMC suppression that can be achieved.

Here is the link to download our datasheet titled Plastic Film Feedthrough Capacitors with Radsok Interface

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The IEMI Threat and a Practical Response

William Turner
Senior Design Engineer
MPE Ltd

IEMI Threat

With the increasing use of electronics to control every aspect of modern life, from smart grids to driverless cars, Intentional ElectroMagnetic Interference (IEMI) is a threat gaining concern. Various initiatives have been set up to address the needs of specific market areas, and new standards are being worked on.

However it is worth understanding what is being protected against and how that compares and contrasts with other EM protection standards. Figure 1 below shows the frequency and comparable magnitudes of the various EM threats. Please note that EMI refers to the typical background EMI that can be experienced from benign intentions such as radio and TV broadcasting, radar, microwave and networking systems, GPS, etc.

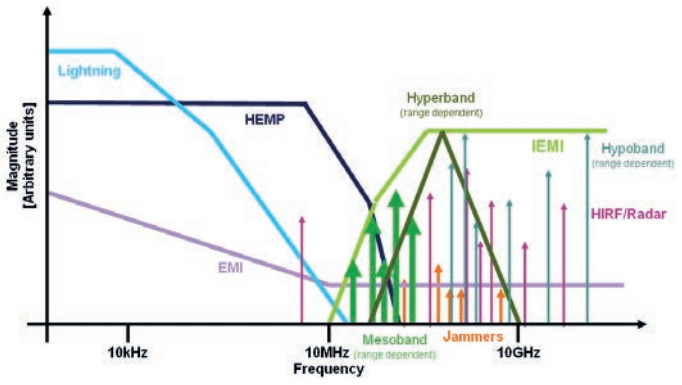

Figure 1 - Comparison of IEMI and other EM disturbances
(image by courtesy of QinetiQ)

It can be seen that IEMI differs from most other EM threats in that it typically occupies a narrow frequency band, dependent upon which specific malicious source is being used. This contrasts with other threats such as lightning and HEMP (high-altitude EMP) which are very broadband in nature.

The other notable difference is the area of the spectrum occupied – IEMI threats are almost never below 10MHz, as the coupling efficiency of such a threat would be much reduced. Instead the frequencies used tend to be much higher, to improve the effectiveness and penetration of any attack. The exception to this is for pulses directly injected into power and communications

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Figure 2 - Microwave oven as an IEMI source
(image by courtesy of QinetiQ)

Figure 3 - Diehl briefcase mesoband UWB source

conductors, where lower frequencies are able to travel long distances with minimal attenuation.

Methods of Threat Delivery

The biggest problem with protecting against IEMI is that the sources can vary massively between different aggressors and the way any attack is launched.

IEC 61000-4-36 is the standard for IEMI immunity test methods for equipment and systems and should be considered essential reading for anyone attempting to protect against IEMI. IEC 61000-4-36 defines categories of aggressors as Novice, Skilled and Specialist. These definitions are based on their capability, and IEC 61000-4-36 gives examples of the types of attack one could anticipate from those categories.

Generally Novice attacks will be short-ranged or require some direct access and take the form of technologically very simplistic and low-cost methods such as modified microwave ovens, ESD guns or even EM jammers that can be bought online for a hundred Euros. Although unsophisticated, such attacks should not be underestimated and could easily cause persistent disruption or damage without leaving an evidence trail of an attack. An example of what can be constructed from rudimentary everyday components is shown in Figure 2.

The next category of Skilled aggressors comprises those with good understanding and experience or who have access to commercially available equipment. That equipment could be something like the Diehl pulser pictured in Figure 3.

This is an off-the-shelf “interference source” capable of emitting a 350MHz damped sine wave output and 120kV/m at 1m continuously for 30 minutes. With an appropriate antenna, this would be capable of disruption or damage at a greater distance.

The third category of Specialist is in the realms of research laboratories and high-end military programs with accordingly high capabilities. This covers systems such as the Boeing CHAMP missile and the Russian-developed RANETS-E, which is capable of a 500MW output and range of 10km. Plentiful information on both systems is available in the public domain. Although it would be obvious if a large truck with antenna was parked outside, or a missile had been launched overhead, a Specialist aggressor’s equipment can be much more subtle than that, especially if fixed equipment can be set up nearby in a building across the street or even an adjoining room. This allows complex equipment to be set up and an attack to go unnoticed for a long time, or perhaps not be noticed at all.

This raises the most critical question concerning protection from IEMI – access. Access is in terms of either distance from threat to target in radiated systems, or to incoming power and comms cables for injected conducted disturbances.

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Effects on Operations

Numerous papers have been written on the disruptive and damaging effects of IEMI attacks on electronic systems, and covering that in detail is beyond the scope of this paper. Readers are encouraged to review the many papers and presentations on the subject.

What can be said here is that the effects can vary from the very subtle – errors in data streams and microprocessor instruction operation through to system lockups, hard resets and even permanent damage rendering the system beyond repair.

The exact effect of a particular aggressor's action against a particular system is very case-specific and would require thorough analysis. However there is one general rule that applies, and it may appear obvious: the greater the interference, either as a conducted or radiated disturbance, the more likely effects will be seen and the more severe they will be.

It has been shown many times that a radiated or conducted disturbance will cause damage at higher power levels, but at lower power levels can cause only minor upsets or even no significant effect at all. This makes disturbance attenuation key to protection.

Asset Protection

While the internal resilience of equipment is a key part of IEMI protection, it is known to vary even between equipment made by the same manufacturer. So often it is not possible to influence that characteristic, especially where third-party equipment is concerned, so one must look instead at how those assets can be protected by external measures.

As can be seen in Figure 1, there is little frequency overlap between traditional threats and IEMI. One should bear this in mind when planning the protection strategy for a system. However it does not mean that existing protection systems or even infrastructure are completely useless, just that they shouldn't be considered the whole solution.

What one does need to consider is the type of IEMI threat likely to be experienced. For example it is unlikely that a small company in the UK will suffer an attack from a Boeing CHAMP missile directly overhead, but it's plausible it could be subject to interference from a malicious individual with some pulse generator plans from the internet. It's plausible that a company of national significance could be subject to organised terrorists, with whatever equipment and skills their organisation possesses.

Bearing this in mind, there are a few different strategies one could adopt for protection. The obvious and technically naïve strategy is to assume that, because all equipment must be to the standard of the EMC directive, it is adequately protected. However the various EMC directive immunity tests are all significantly below the levels that could be experienced during an IEMI attack (V/m against kV/m), and typically EMC directive conducted compliance focuses on the lower bands – when SMPS and similar switching

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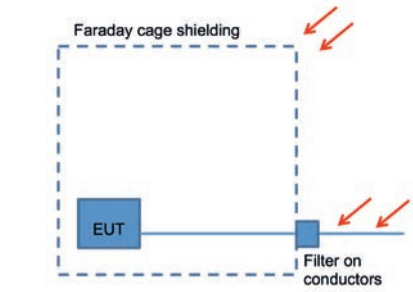

Figure 4 - Classical protection method

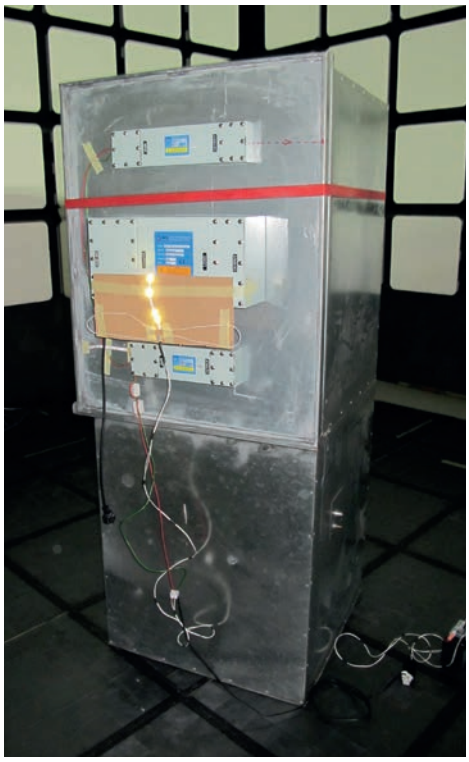

Figure 5 - MPE filters subjected to IEMI attack

noise problems do not arise at the higher bands where an IEMI threat exists. ESD protection only has limited relevance: as it only mandates no permanent damage, disruption is acceptable.

The second approach is to go to the other extreme and apply the traditional metal box / Faraday cage approach shown in Figure 4, as often seen in high-end military applications and EMC test chambers. This assumes no inherent resilience in any equipment and is the same strategy adopted for Mil-Std 188-125 HEMP (nuclear EMP) protection on critical military infrastructure where even a minor disruption isn't tolerable. For IEMI protection applications where that same 'work through' requirement exists, then this really is the only guaranteed solution: one would simply need to ensure that the shield performed up to at least 18GHz and the same for the filters on incoming power and comms.

As confirmation of this principle, MPE recently tested their filters against the Diehl pulser pictured in Figure 3 to test this hypothesis. At this stage it was only a qualitative test with LEDs positioned both inside and outside a shielded cabinet, with the power source outside and filtered using one of MPE's HEMP filters. The effects were very clear, with no LEDs being damaged inside the cabinet even at very short ranges from the Diehl source: however most of the LEDs outside suffered failure at this and greater distances.

There are plans to do more detailed quantitative tests against this and other IEMI sources, including the often touted modified microwave oven. However, knowing that the same filter construction has been proven in 40GHz filtering / shielding applications and the energy from IEMI is still below that of Mil-Std 188-125 (150kV 2500A conducted), the outcome is expected to again be positive and to show that MPE standard HEMP filters also protect against IEMI. The assessment is likely to take a similar approach to that of HEMP testing described in IEC 61000-4-24, where residual currents and voltages are measured on the protected side of the filter against a known incoming pulse.

For lesser applications taking this approach, one would only need adequate shielding and filtering to the appropriate level for the anticipated threat. The reality is that such a shield wouldn't be worth providing unless it was giving at least an overall 60dB reduction. This approach could be scaled appropriately to what is desired to be protected: if only a server cabinet is deemed critical, then only that needs shielding and filtering. The downside of such protection is the cost – a cabinet alone could run to over £1000. Protecting a large, high-end military facility can cost in excess of £100,000 in filters and more than £1m in shielding and architectural work even if done at the point of construction. Retrofit would add even further to the costs. Such a facility would also require significant maintenance, adding to the bill. This cost can be very offputting for all but the most critical of applications.

Another approach to the problem is to assess what protection is already there, the threats that are likely to be a problem, what really needs protecting, and to apply a staged protection scheme.

This concept doesn't rely on a single component providing huge signal attenuation, but on multiple smaller and often incidental

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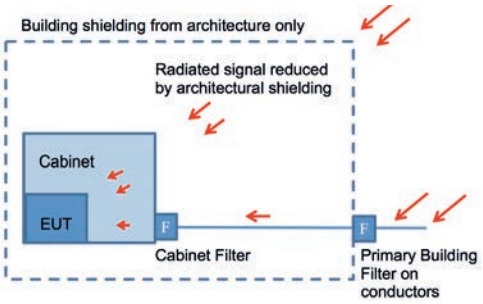

Figure 6 - Staged protection

components to give a similar attenuation at a much reduced cost. The concept is shown in Figure 6. This is a tailored solution to suit individual scenarios and equipment. Some buildings can provide 10dB of shielding simply due to the materials used and their construction style. The distance an aggressor could get to any target could be quite long. Perhaps the site has an extensive perimeter with security, or only a specific room needs to be protected in a large building, and this gives a natural attenuation to any radiated or conducted attack originating off-site.

Equipment cabinets and cases should also be taken advantage of. A typical commercial EMC cabinet compared to a unshielded rack could provide 30dB of attenuation up to1GHz and could still be providing some up to perhaps 5GHz.

The conducted protection should try to coincide with the shielding to avoid bypass coupling and make the most of the inherent shielding protection. If the building has very good shielding, then a large incoming filter at the entry point would be best: but if it is very poor and the cabinet or individual equipment is carrying the majority of the shielding, then this is where the filtering should be located.

Distributed filtration can be used with several lower performance filters in place of a single high attenuation filter. Some of those filters could be part of the original equipment, but bear in mind that, although most equipment has incoming power filters, these are often only low frequency for EMC compliance and not really suitable for IEMI protection. Also the combination of filters in the system should cover the entire frequency spectrum of concern. This requires assessment against the probable threats and tolerable disruption: there is a standardised way to define these in the appendices of IEC 61000-4-36.

A vital part of the filtering solution is the surge suppression performance against pulse-type IEMI attacks, which can have very high energy content and fast rise times. Those rise times can be in the order of nanoseconds or even picoseconds, billionths or trillionths of a second.

Compare this to the most common type of high energy surge suppression of lightning protectors, typically spark gap or varistor types. These only operate in the microsecond timescale: although some of the technologies can in theory operate far faster than this, in practice they don't when used in lightning applications. It makes any lightning protection very ineffective against IEMI.

This is where the crossover with HEMP is important: the Mil-Std 188-125 E1 pulse also has a fast rise time in the nanosecond scale and energy content far exceeding that of any likely IEMI attack. As the performance won't suddenly cease at the top of the HEMP spectrum, this means that a Mil-Std HEMP protection device will protect against all but the fastest conducted pulses seen with IEMI threats. Nevertheless Mil-Std HEMP devices, as previously discussed, are expensive and quite likely excessive in all but the most sensitive and critical cases where HEMP protection is also likely to be a concern.

Therefore in most cases what is desired is in effect a lower cost and performance HEMP filter, with performance stretching to at least 18GHz. Fortunately IEC 61000-4-24 is nearing publication, which defines a range of performance criteria for HEMP protection on civilian applications based on more relaxed residuals than the Mil-Std (it also includes the Mil-Std as the special case).

Threat Detection

If the system in question can tolerate interruptions or damage without serious unrecoverable consequences, and the business case is not currently good enough to invest in protection, there is an intermediate step before protection that is complementary to it even when installed.

This takes the form of detection of any incidents and profiling it in the specific scenario, with an aim to gather evidence for the purposes of the cost/benefit analysis of protection systems and for logging IEMI attacks or disruptions to positively identify threats against system faults. This has the added benefit of logging unintentional EMI effects in the increasingly crowded spectrum.

This approach has only become viable recently thanks to a shift in the philosophy of detection systems. Traditional IEMI monitoring equipment is very large, expensive and complex, requiring highly skilled staff to operate. These can give a full profile of any attack or threat detected, with analysis of the specific source in real time, etc. However the cost and maintenance of such a detection system can approach or exceed that of system protection, making detection an irrelevant and costly intermediate step for general use.

To make logical sense, what is required is a detection system of lower cost and complexity. Fortunately MPE and our technical partner have been developing a solution, and we are now at the pre-production prototype stage. This differs from the traditional detection approach by simply detecting anything that causes a large enough EM disturbance and logging it in the time domain.

Figure 7 - Demonstration of available analysis

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By logging the disturbance in enough detail in the time domain, offline analysis can then be performed, removing the need for complex analysis, and thus cost, within the detector. By keeping the costs low, multiple detectors could be installed, giving a far more detailed view of the threat. Information that this could give to the analyser includes increased accuracy on wave shape and triangulation of the threat source, and attenuation provided by existing buildings, infrastructure or shielding.

This solution gives the two desired outcomes from detection: an evidence trail for any cost/benefit assessments for stakeholders to invest in protection, and the time-stamping of disturbances to be correlated with any CCTV or other evidence in legal proceedings.

Summary

It has been shown that the IEMI threat is real regardless of industry and that existing protection systems cannot be assumed to be adequate and in most cases will be found wanting by a well-planned attack.

The steps required to effectively and adequately protect against the risk of IEMI are clear – understanding the nature of the threat, taking advantage of existing protection systems and supplementing them with IEMI-specific measures only where necessary.

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Meet the Ampere team – Andrea Casati, Roberto Picker, Antonella Bosotti, Lorenz Caselunghe

MPE filters are flying high with Ampere in Italy

MPE's distributor in Italy is Ampere, a family-owned business established in 1940 whose current President Roberto Picker is grandson of the founder Gerardo Picker. The company's main activities are the sales and distribution of instruments and systems for electrical measurement and test as well as EMC compliance products, whilst also offering in-house electronic laboratory services, site installations, commissioning and repair services to customers across Italy and beyond.

Ampere is located in Milan's business centre and is an ISO 9001:2008 and OHSAS 18001:2007 registered company, certified by DEKRA. It employs 23 permanent staff, including 7 sales engineers, 3 technical engineers and 4 service engineers.

Whilst Ampere has successfully distributed a variety of products from the MPE portfolio in the Italian market, to date the greatest success has been supply of products for use on the Eurofighter Typhoon aircraft. MPE and Ampere were originally approached to resolve an EMC issue within the design of the countermeasures system and, from Tranche 1 of the prestigious multinational Eurofighter program, MPE has supplied thousands of EMC filters through Ampere for this platform.

MPE's custom ceramic capacitors are incorporated into the control mechanism of the dispenser located below the fuselage for countermeasure chaff and flare decoys. MPE's filters are specified to provide this device with the highest level of electromagnetic interference protection, preventing electrical noise disturbance from the actuator. To date MPE has manufactured over 27,000 ceramic filter units for the platform and provides them on an ongoing basis for the latest export Tranches of Eurofighter.

In addition, Ampere continues to distribute many other MPE filter and capacitor products to the Italian market, and the latest focus is on the pluggable TEMPEST filter range. Ampere has recently translated the pluggable TEMPEST brochure into Italian, is actively progressing enquiries for this new product range and has numerous customer presentations planned for the coming months.

Download the pluggable TEMPEST brochure in Italian via this link

As well as Roberto Picker himself, MPE's main contacts for EMC products at Ampere are Andrea Casati – Account Manager, Lorenz Caselunghe – Strategic Marketing Manager and Antonella Bosotti – Back Office Sales, pictured here. Lorenz joined Ampere earlier this year to expand their team: a graduate in electronic engineering, he has a career background in electronic navigation systems for leisure marine and automotive applications.

www.amperespa.it/company-profile

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Supporting Radiotechnika at MSPO in Kielce

From 1st to 4th September the Kielce Exhibition and Congress Centre in central Poland was the impressive stage for the 23rd annual International Defence Industry Exhibition MSPO and the 21st International Logistics Fair Logistyka.

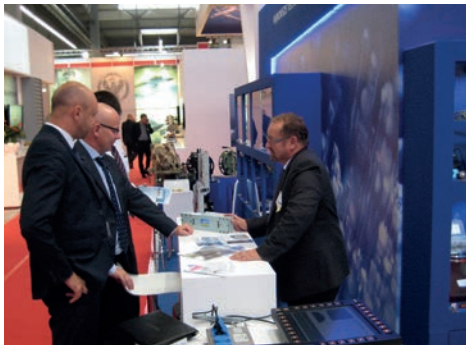
The record-breaking MSPO, filling an exhibition space of over 27,000 m^2, was the showcase for 568 exhibitors from 30 countries. There were almost 20,000 visitors, notably the Republic of Poland's President Andrzej Duda and official foreign delegations from 58 nations.

MPE were present on the stand of their Polish distributor Radiotechnika, showing a full range of MPE products including a four-socket pluggable TEMPEST filter functioning throughout the event.

"The Latest Technology in Practice" – John Jephcott, Key Account Manager of MPE, (left) on the stand at MSPO with Marcin Hamberg, the EMC Product Manager of Radiotechnika Marketing

Radiotechnika has been operating in the city of Wrocław since 1947 and is one of Poland's oldest and most famous electronics manufacturers and distributors. Whilst the company specialises in power supply and distribution systems for military vehicles, it is also Poland's no.1 military-grade cable harness and fibre optics supplier. All products from Radiotechnika are designed to provide a high level of electromagnetic compatibility.

MPE have been conducting business with Radiotechnika Marketing for more than ten years, but over the last five years MPE have seen business in the Polish region expand continuously and significantly.



John Jephcott discusses MPE's EMC filter solutions with customers visiting the Radiotechnika Marketing stand at MSPO

This dramatic success has been attributable not only to the MPE brand becoming more established and trusted within Poland and to the reliability of MPE products, but also to the joint efforts of MPE and Radiotechnika Marketing in flying the flag with exhibition stands such as MSPO, technical seminars and customer visits.

The products supplied to the Polish market range from single-line feedthroughs for military vehicle applications to installation filters for fixed power installations to, more recently, custom power filters for radar systems.

http://radiotechnika.com.pl/en

Radiotechnika marketing sp. z o.o.

MSPO 23rd International Defence Industry Exhibition 1-4.09.2015

MPE
Quality, Reliability, Performance

Company Bulletin

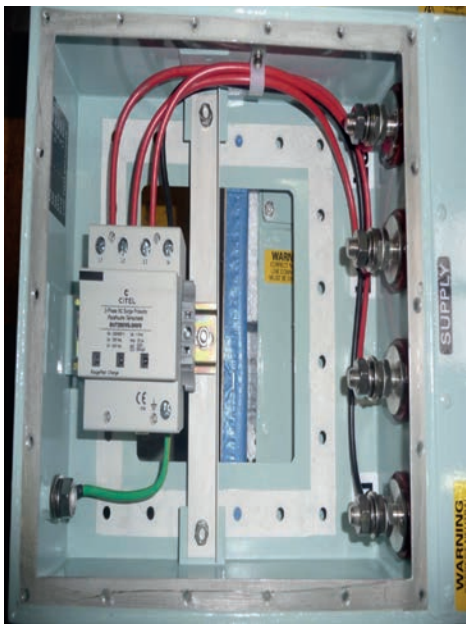
for EMC, EMP & TEMPEST Protection

Issue 7

MPE powerline filters safeguard longrange air defence radar system

The established Ground Master 400 (GM400) from Thales Raytheon Systems is a 3D longrange air defence radar, offering detection from very high to very low altitudes. It tracks a wide range of targets – from highly manoeuvrable tactical aircraft flying below several hundred feet to the unconventional device with small radar signature such as UAVs or short-range missiles – ensuring an excellent global air picture.

The Ground Master (GM) family architecture is based on common building blocks and interfaces, a stacked beam concept and digital beam forming, providing complete range and altitude coverage. For ease of maintenance, GM radars can be remotely monitored using a standard protocol underpinned by cyber solutions.



Having been developed and designed into the system by MPE's French distributor Euromip, the MPE custom powerline filter for the GM400 Thales Raytheon ground radar was sold by them to French defence contractor Thales. Thales selected this EMI protection filter on the basis of the really strong technical support provided by MPE's engineers, the company's response time and its product quality.

In fact the relationship with Thales has always been close, with MPE being the principal supplier of all main powerline filters used on its radars. More than 20 custom filters have been developed by MPE for Thales (mainly SPN and TPN filters from 5A to 250A).

The Ground Master 400 is part of Thales Raytheon Systems' fully digital 3D air defence radar family. Designed to protect the key assets of forces deployed on remote operations, the GM400 is the only system of its kind to combine the superior detection of air threats at any altitude – especially high manoeuvring targets at low elevation – with an unprecedented level of availability and mobility.

The world-class GM400 system has already been selected by the defence forces of ten nations, including Canada, Estonia, Finland, France, Germany, Malaysia and Slovenia.

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The custom EMC filter developed by MPE for TerOpta's TeroLight intelligent lighting system

A TeroLight unit

A TeroLight unit in situ

Custom EMC filter lights up the green energy market

TerOpta Ltd has been developing the TeroLight intelligent lighting system for a number of years. The system is based upon independent marshalling boxes being used to control different elements or circuits within buildings, with communications between them using mains-borne signalling. To ensure signal integrity and high system performance, mains-borne noise and interference need to be removed from the system.

In 2012 TerOpta approached MPE to develop a custom EMC filter for use on their system, after having unsuccessfully tested many commercial units. Since the marshalling unit had already been designed and prototyped, the space envelope, mounting style, connection type and cost budget were prescribed to MPE, who were asked to achieve a level of electrical performance within these limits.

MPE became heavily involved in the development and testing of the filter units within systems, to determine the optimum level of electrical performance that would ensure the correct operation of the TeroLight system. The result has been a custom unit, very different to those typically manufactured by MPE for its defence customers.

Independent studies and the latest BS building energy rating specifications EN15232 state that the use of a controlled lighting system can provide energy savings of over 30%. In addition it can provide a more sympathetic environment for occupants. Nevertheless a typical current controllable lighting system suffers from disadvantages. It is expensive to install in new buildings or to retrofit, whilst in the latter case modification is generally difficult, is disruptive to occupants and may damage the building fabric.

The TeroLight intelligent lighting solution from TerOpta overcomes these problems by utilising the existing mains wiring to carry control signals. Therefore the building fabric is not impaired, control cabling does not need to be installed, and modification is easy.

The system is simple to install, with its intelligent marshalling boxes being fitted and then interface software, lights, sensors and switches being connected, so that the system can be up and running very swiftly.

Having been designed for use by unskilled operatives, operation is straightforward and intuitive via a web browser, with little training required. The system can be expanded or modified at any stage by simply adding or moving TeroLight units. Moreover there are no serviceable parts, and therefore the system has a very high reliability and can be classed as "fit-and-forget". Its operational life is calculated to be more than 15 years, with a typical payback period as short as 24 to 48 months.

Michael Sharratt, the CEO of TerOpta, explained: "In the first

instance we approached MPE due to their reputation for high performance and their experience of developing custom solutions. During the development process, MPE have been very reactive and also conscious of, and sympathetic to, the iterative processes involved in new concept developments such as the TeroLight system. We continue to work closely with MPE and hope to do so in the coming years."

Paul Currie, Sales & Marketing Director of MPE, commented: "The development with TerOpta of a custom filter for the green energy market presented a number of new challenges, not least of which were the mechanical enclosure requirements. Having MPE's design engineers work closely with the TerOpta team, we gained a much clearer understanding of the problems to be addressed, and this has resulted in a totally unique solution being manufactured, which has furthered MPE as a business.

"I am confident that the innovative TeroLight system will become widely adopted over the coming years, and I also expect that MPE will now expand upon its work in the green energy market."

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