MPE
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MPE 90th Anniversary 1925 – 2015

Company Bulletin

for EMC, EMP & TEMPEST Protection

Issue 9

MPE PEOPLE

MPE stand buzzing at DPRTE 2016 in Cardiff

MPE exhibited for the first time at the annual DPRTE (Defence & Procurement – Research & Technology – Exportability), held in mid-March this year at the Motorpoint Arena in Cardiff. MPE had previously visited the event and made the decision to exhibit this time, based on its focus, previous high attendances and also the visit of a delegation from the US Foreign Comparative Testing (FCT) organization.

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Spotlight on Jan Nalborczyk

Technical Director Jan Nalborczyk first joined MPE in November 1979, when it was still Dubilier, as its Design Engineer. Via positions as Assistant Chief Engineer in 1981 and Chief Engineer in 1985, he assumed the role of Technical Director in 1995. Jan was one of four Directors who formed the management buyout team in February 1997 leading to what is the current MPE.

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MPE TECHNOLOGY

Bespoke solutions tailormade for military vehicle filters

Whilst military vehicle filters have always been a well-established MPE offering, MPE have recently updated their military vehicle catalogue to encompass the full breadth of standard ranges and describe MPE's custom capability in greater depth as well as various updated compliances. MPE have been designing and manufacturing custom EMC filters for military vehicles for more than 50 years.

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MPE launches World's first HEMP protection filters for commercial use

As Will Turner of MPE is going to describe at the European Electromagnetics Symposium (EuroEM) within the paper entitled "The Protection of Commercial Infrastructure against HEMP and IEMI", the company is launching the World's first range of HEMP protection filters designed and developed specifically for the commercial marketplace.

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MPE DISTRIBUTOR NEWS

MPE filters stand the test in Spain

Adler Instrumentos S.L. has represented MPE in Spain for almost 20 years now. The company was founded in 1995 by four shareholders and currently has 24 staff operating from five offices – in Madrid, Barcelona, San Sebastian, Seville and Lisbon. Last year Adler moved into its new headquarters premises in Madrid where 16 staff are located.

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MPE builds upon meteoric sales growth in Korea

The Republic of South Korea was one of the top three territories for MPE in terms of sales during 2015, with specialist local distributor Eretec championing MPE's interests. David Seabury, Will Turner and Paul Currie visited the territory in February. David and Paul were in Korea for five days, engaging in customer and project meetings as well as participating in a trade mission arranged by UKTI North-West.

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MPE APPLICATIONS

MPE filters support Falcon vehicle-mounted communications & ISTAR

MPE has been delivering high-reliability, high-performance EMC, EMP and TEMPEST specification filters for the vehicle-mounted Falcon mobile shelter program. This is the battlefield broadband, ground-based communications system from BAE Systems.

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EMC filters for warplane towing traverser

The Mantis is a battery-electric towing traverser from Curtiss-Wright Defense Solutions designed specifically for the deck and ground handling of military helicopters and fighter aircraft, especially the new-generation, low ground clearance aircraft such as the Lynx Mk 8 and also the Merlin, Harrier and Apache.

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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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MPE exhibited for the first time at the annual DPRTE (Defence & Procurement – Research & Technology – Exportability), held in mid-March this year at the Motorpoint Arena in Cardiff (www.dprte.co.uk). MPE had previously visited the event and made the decision to exhibit this time, based on its focus, previous high attendances and also the visit of a delegation from the US Foreign Comparative Testing (FCT) organization.

This important defence procurement showcase in South Wales was again thronging with over 1500 visitors. It is smaller than the likes of DSEI, Electronica or the Paris Air Show, yet concentrates far more on the detail of vital lower-tier technologies and services underpinning the defence sector – rather than on higher profile end-products, such as typically the military vehicles, warplanes, weaponry, ICT systems and UAV programs of prime defence contractors.

Paul Currie and John Jephcott of MPE had an exceptionally busy time fielding enquiries from visitors to the MPE stand which, alongside a selection of the company's standard EMC and EMP filters, majored on its custom filter and capacitor solutions. Furthermore MPE displayed a concept demonstrator of a standalone IEMI detector.

Here John Jephcott of MPE (right) is discussing filter and capacitor solutions with Antony Fletcher, Portfolio Manager – Land & Sea Systems, from the Defence Trade Office at the British Embassy in Washington, DC

The quality of visitors to MPE's stand was very high, with almost all of them there to discuss a specific application or project, including for example custom filters for maritime platforms and TEMPEST filters for a NATO headquarters project. In fact the international reach of DPRTE was impressive, attracting many visitors from overseas territories alongside a large contingent, as expected, from the UK Ministry of Defence.

Moreover MPE was invited to present its latest ground-breaking technologies – principally high-current HEMP filters and the IEMI detector concept demonstrator – to the US Foreign Comparative Testing (FCT) team. The FCT delegation are tasked with sourcing foreign technology applicable to the US defence forces which is either unavailable indigenously in the USA or has distinct technological or cost advantages.

Products on the MPE stand at DPRTE 2016

Accordingly MPE met individually with FCT personnel representing the US Air Force, US Army and US Special Operations Command (SOCOM). Of particular interest were MPE's high-current HEMP filters, which are increasingly used in the USA to address sites experiencing issues and failures with indigenously manufactured HEMP filters. The attendees from the FCT regarded MPE HEMP filters as having superior technical performance and reliability and therefore a marked technological advantage.

Following the daylong event, MPE participated in a reception hosted by the Welsh Government. That took place at the St David's Hotel, Cardiff Bay, and provided an excellent opportunity

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The US Foreign Comparative Testing (FCT) delegation presents during the event

to meet with technical personnel from the MoD and Welsh SME companies – as well as representatives from the USA – in a relaxed and convivial atmosphere.

The next, eagerly awaited DPRTE event is set for 16th March 2017.

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Jan Nalborczyk

Spotlight on Jan Nalborczyk

Technical Director Jan Nalborczyk first joined MPE in November 1979, when it was still Dubilier, as its Design Engineer. Via positions as Assistant Chief Engineer in 1981 and Chief Engineer in 1985, he assumed the role of Technical Director in 1995. Jan was one of four Directors who formed the management buyout team in February 1997 leading to what is the current MPE.

Since almost half of MPE's production consists of customised designs, Jan and the engineering team have always fulfilled a central role in researching and developing new designs and modifying existing ones.

This work has included technical liaison with customers around the globe on their applications and supplying them with product samples alongside technical proposals. Jan has worked closely with many customers, such as the UK's Ministry of Defence, on all aspects, providing advice and technical support on product suitability, specifications, quality and performance, developing ground-breaking new products, overseeing installations and organising end user training.

Jan graduated from the University of Birmingham, UK, in 1973 with a BSc Honours degree in Physics. Initially he took a position as Research Engineer at the Lucas Group Research Centre in Solihull, where he worked for three years on varistor materials and their properties – for which he was granted two patents – as well as other automotive projects. Then Jan chose to move into engineering as a Process and Development Engineer on ceramic capacitors – at Erie UK which became ITT Components in Norwich – prior to late 1979 when he joined Dubilier, which at the time had two factories in the Knowsley area of Liverpool.

At those sites millions of low-cost capacitors and resistors were being produced weekly for the mainstream consumer TV and white goods market. However, with increasingly severe competition from the Far East, the decision was taken to reorientate production towards low-volume, highly technical products – specialist EMC filters and capacitors for niche markets such as defence, aerospace, telecommunications and shielded rooms – a strategy pursued with great success to the present. Ericsson, Hewlett-Packard and Schaffner were typical of the major specialist accounts which the company attracted in those early days.

Fast forward to August 2011, when Jan was recruited as the representative of the EMC Industry Association (EMCIA) to the BSI GEL210/12 Committee. He immediately went on to represent the BSI on the highly prestigious SC77C Committee of the International Electrotechnical Commission (IEC), starting with his first meeting in Seoul, Korea, in October 2011. This Committee is 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.

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In July 2014, for his contributions to advances in HEMP filter design, Jan received the rare honour of being elected a Fellow of the Summa Foundation, based at Albuquerque, New Mexico: this is a philanthropic organisation of global stature which promotes scientific and educational activities in the field of electromagnetics. Jan is also a Chartered Engineer (CEng) and Member of the Institution of Engineering & Technology (IET).

Jan and his wife live in Ormskirk, Lancashire, and have three grown-up children, two sons and a daughter. Jan's hobbies include theatregoing, country walks with the family dog and world travel.

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Multi-line EMC filters Types 1 and 2 for single- and multi-speed motors on military vehicles

Feedthrough capacitors for military vehicles

EMI-suppressed 24V alternator shroud

Bespoke solutions tailormade for military vehicle filters

According to the latest figures, defence spending worldwide increased during 2015 and is set to grow further during 2016. Unsurprisingly within Europe, the UK, France and Germany allocate the largest defence budgets. However, in a reversal of recent yearly trends, the proportion of these budgets being invested in land-based vehicle platforms is once again on the rise. Within these ever more sophisticated defence vehicle platforms, the threat of interference between equipment is ever more prevalent, and the need to ensure EMC integrity ever more critical.

Whilst military vehicle filters have always been a well-established MPE offering, MPE have recently updated their military vehicle catalogue to encompass the full breadth of standard ranges and describe MPE's custom capability in greater depth as well as various updated compliances.

MPE have been designing and manufacturing custom EMC filters for military vehicles for more than 50 years. This has provided a wealth of experience and understanding of the types of suppression required to provide EMC solutions for a wide variety of applications on military vehicles and enable them to comply with the relevant military EMC specifications.

During this time MPE has supplied thousands of filter and capacitor solutions, all of which will have been tested and approved for use in their specific end application. Many of these designs have been NATO codified, and many have also been allocated UK MOD Fighting Vehicle registration numbers for use on military vehicles. All products are designed and manufactured by MPE in the UK in an ISO 9001:2008 approved factory and, importantly, are RoHS compliant and CE marked.

Many MPE solutions relate to standard vehicle equipment such as alternators, wiper motors, blower motors, washer motors, oil cooler fans, air-conditioning equipment and engine management systems to enable vehicles to comply with Fitted For Radio (FFR) requirements. Other designs relate to more specialist devices such as beacons, smoke dischargers, door actuators, turret motors – and onboard ancillaries such as shielded containers, communications systems and medical equipment.

Experience has shown that, for every given application, the design will enable defence quality feedthrough capacitors to achieve the necessary high-frequency performance and – although the solution may vary either in current rating or number of filtered lines to suit the application – the type of filter circuit configuration will often be very similar.

Of course each customised filter solution adopted needs to be application-tested to verify that the equipment complies with the suppression figures as specified, but the chances of vehicle

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equipment passing first time is greatly increased compared to where general-purpose filters are used which are not specifically designed for the application.

What is more, the mechanical customisation of MPE's standard products is often necessary to accommodate practical constraints such as confined spaces, differing shielding requirements and alternative mounting arrangements, termination styles and connections.

You can download your personal copy of MPE's comprehensive, new, 14-page military vehicle filter catalogue from here.

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Commercial HEMP equipment filter

Commercial HEMP powerline filter

MPE's World first sets tongues wagging

In a World first, MPE launched at the EuroEM 2016 Conference at Imperial College, London, in July its ground-breaking new range of HEMP protection filters designed specifically to address the needs of the commercial market. Both powerline and equipment variants from the range were on display and generated a high level of interest throughout the event.

Prior to late 2015, only the very onerous Mil-Std-188-125 had been available to verify any installed HEMP protection system and, whilst it was widely accepted that the level of protection for commercial uses need not be as great as for military applications, the requirement to meet this military standard demanded filters whose performance, and therefore cost, could often far outweigh their practical requirement.

The publication in late 2015 of the new Standard IEC/EN 61000-4-24 ("Test Methods for Protective Devices for HEMP Conducted Disturbance"), which details two lesser Severity Levels – Industrial Level 1 and Critical Infrastructure Level 2, allowed for HEMP protection systems to be verified more exactly for their intended application.

In response, MPE's revolutionary new range of commercial HEMP protection filters was launched in order to directly address the threat to public utilities, telecommunications, transportation, computer networks, datacentres, control rooms, the emergency services and other key national infrastructure within the framework of homeland security.

The filters have been designed with just the same integrity and reliability as the existing wide range of MPE HEMP filters. However, from its long experience, MPE has been able to utilise alternative materials and manufacturing techniques, making the commercial HEMP filters a much more attractive and cost-effective option.

As the first and only manufacturer globally to have designed and developed a range of commercial HEMP filters to specifically meet the requirements of Severity Levels 1 and 2, MPE is already busy producing filters to fulfil advance orders.

MPE presented its commercial HEMP protection filter range at the 2016 ECNE (Energy Council of the North-East) Fall Engineering & Operations Conference which took place at Danvers, Massachusetts (www.ecne.org/events/calendar).

The session on October 27th entitled "The Threat to United States Critical Infrastructure from Electromagnetic Pulse (EMP)" provided an educational overview of the threat of EMP/HEMP and IEMI, what protection the current infrastructure offers, and what should be considered to better protect against potential threats.

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A panel of experts discussed what are EMP/HEMP and IEMI, the types of threats, shielding, filtering and monitoring.

You can download here the 12-page MPE product brochure “Commercial HEMP Protection Filters”.

ecne

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Pictured with John Jephcott of MPE (left) at the Madrid office is Millán Fernández – Technical Director of Adler

MPE filters stand the test in Spain

Adler Instrumentos S.L. has represented MPE in Spain for almost 20 years now. The company was founded in 1995 by four shareholders and currently has 24 staff operating from five offices – in Madrid, Barcelona, San Sebastian, Seville and Lisbon. Last year Adler moved into its new headquarters premises in Madrid, as pictured here, where 16 staff are located.

Adler's business is predominantly the supply of electronic instrumentation to test facilities and laboratories inside Spain. 80% of its business is in the industrial and commercial marketplace, with the other 20% being in the defence sector.

Throughout its history Adler has enjoyed success with MPE EMC filter products – CleanPower and powerline filters – supplied for shielded room and test equipment applications.

In 2015, following a lengthy design and bidding process, Adler secured the contract to provide powerline protection filters for an MOD airbase in Madrid connected to NATO Communication and Information Systems. The end-user had a requirement for high insertion loss performance across the full frequency spectrum, and therefore extended performance filters were required from MPE.

The customer specified MPE filters because of their high level of performance and reliability. However, it was Adler's ability to liaise directly with the appointed electrical contractor that finalised the contract. MPE provided 21 filters, a combination of 32A and 63A, three-phase and neutral, extended performance powerline filters, and these are currently being installed on site.

Millán Fernández, Technical Director of Adler Instrumentos, commented: "Whilst recent economic factors within the Spanish territory have impacted upon the filter opportunities available to Adler and MPE, the recent success at the Madrid airbase is testament to the quality and reputation of MPE's filters and Adler's long-term commitment to the successful promotion and sales of these products."

www.adler-instrumentos.es

Adler

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The SC77C Sub-Committee in session at the Best Western Premier Guro Hotel, Seoul

Paul Currie's presentation on EMP, HEMP and IEMI threats and protection at the offices of Eretec

Anechoic chamber installation by Eretec for automotive testing at the INFAC Corporation in Korea

MPE builds upon meteoric sales growth in Korea

The Republic of South Korea was one of the top three territories for MPE in terms of sales during 2015, with specialist local distributor Eretec championing MPE's interests. So, following this very strong sales record, David Seabury, Will Turner and Paul Currie visited the territory in February. David and Paul were in Korea for five days in all, engaging in customer and project meetings as well as participating in a trade mission arranged by UKTI North-West.

Will was in Korea for a three-day SC77C Committee meeting and then met up with David and Paul for the last two days of the visit. The SC77C meeting was held at the Best Western Premier Guro Hotel, close to the premises of the Korea Testing Laboratory (KTL). Will was representing UK BSI at the meeting, which is typically held twice a year.

The IEC (International Electrotechnical Commission) SC77C Committee is concerned with standardisation in the field of EMC to protect civilian equipment, systems and installations from threats by man-made, high-power transient phenomena.

The Sub-Committee on which Will sits has recently published new documentation for commercial HEMP filters, detailing various levels of protection dependent upon the criticality of the site in question. Until this publication, the only level of HEMP protection defined was that in the military standard Mil-Std-188-125, which represents an extremely high level of protection designed for mission-critical defence applications and so was adjudged too costly for most commercial-type applications.

The SC77C Sub-Committee meets next in London shortly after the European Electromagnetics Symposium (EuroEM) event, 11th-14th July at Imperial College, South Kensington, London, where MPE has been accepted to present three papers.

During MPE's visit Eretec hosted an EMP seminar at their headquarters offices. This was attended by end-users and specifiers from the Ministry of National Defence (MND) – including a four-star general, the Korea Testing & Research Agency (KTR), Korea Testing Laboratory (KTL), the Korea Information Communication Industry Institute, the National Security Research Institute and the Korea Radio Promotion Association.

The hosts Eretec provided an overview session and then, as pictured here, Paul Currie delivered a 90-minute presentation on the theme of EMP, HEMP and IEMI threats and protection.

MPE also visited a recent large anechoic chamber installation completed by Eretec for automotive testing at the Japanese-owned INFAC Corporation (www.infac.com/index_eng). Eretec supplied and installed the EMC shielding, EMC doors, EMC filters, waveguides and all internal equipment systems including pyramidal absorbers.

Finally, MPE went on to attend an official reception organised by

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At the British Embassy reception, pictured left to right standing are David Seabury, Paul Currie and Will Turner of MPE, Major In-Young Baek (MND) and Miss Kelly Cho (Eretec). Seated in front, from left to right, are Mr Tae-Heon Jang (KTL) and Mr Jun Sun Park (Eretec).

UKTI at the Ambassador's residence in the grounds of the British Embassy in Seoul. The reception was hosted by Charles Hay, HM Ambassador to the Republic of South Korea since February 2015, and was to welcome a trade mission from the North-West of England in which MPE was taking part.

The MPE party were accompanied by five invited guests – Mr Jun Sun Park and Miss Kelly Cho (Eretec); Mr Tae-Heon Jang (KTL); Mr Woochul Park (KTR); and Major In-Young Baek (MND). This reception was also attended by senior members of the British Embassy staff, the head of UKTI in Korea and the CEO of the Chamber-of-Commerce in Korea.

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Falcon datacomms system in use (image by courtesy of BAE Systems)

Falcon system mounted on the British Army's MAN 4x4, 6-tonne, HX60 truck

MPE filters support Falcon vehicle-mounted communications & ISTAR objectives

MPE has been delivering high-reliability, high-performance EMC, EMP and TEMPEST specification filters for the vehicle-mounted Falcon mobile shelter program. This is the battlefield broadband, ground-based communications system from BAE Systems.

Falcon assists and supports ISTAR, the process of integrating the intelligence process with surveillance, target acquisition and reconnaissance tasks in order to improve commanders' situational awareness and consequently their decision-making.

The increase in the use of ISTAR assets delivering huge quantities of video imagery and information demands systems which are capable of handling large amounts of data. Meeting these exacting requirements, Falcon is fundamental to the UK Armed Forces in providing robust, high-capacity network services right across the battlefield.

The four different MPE filter products supplied have consisted of a 63A filter for the main incoming power feed, a 32A EMP filter for the interior of the shelter, six 10A TEMPEST filters also inside the shelter, and a 20A feedthrough capacitor.

Providing secure, high-capacity voice, data and video communications, staff at command headquarters can operate across up to four separate security domains on a wide area network. The Falcon system is carried on the British Army's standard MAN 4x4, six-tonne, HX60 truck (as pictured here) for mobility and flexibility.

For further information on MPE's high-performance powerline filters for shelter applications, visit www.mpe.co.uk/category/installation-filters/ or to download a product overview brochure click here.

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EMC filters for warplane towing traverser

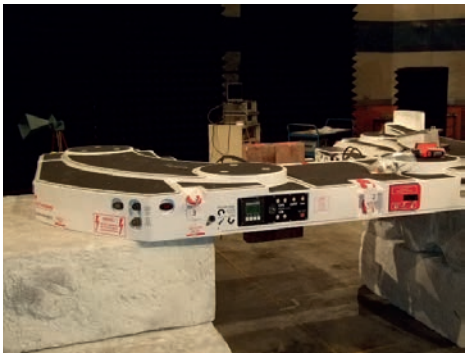
The Mantis is a battery-electric towing traverser from Curtiss-Wright Defense Solutions (www.curtisswrightds.com) designed specifically for the deck and ground handling of military helicopters and fighter aircraft, especially the new-generation, low ground clearance aircraft such as the Lynx Mk 8 and also the Merlin, Harrier and Apache.

The Mantis provides the capability to manoeuvre helicopters and fixed wing aircraft within the confines of a flight deck, shipboard hangar space or ground apron. The device has the ability to drive in four directions and spin on the spot around the tow point.

Typically the Mantis cradles the nose wheel of warplanes on an aircraft carrier and thereby facilitates their multi-axis movement into position above and below deck. Offering fast, precise control from an umbilically connected operator chest pack, the Mantis fits wholly within the aircraft footprint to permit high-precision, high parking densities and make the best use of valuable parking space.

Since this solution addresses a defence requirement, during the design phase it was identified that there would be a need to ensure levels of electromagnetic compatibility (EMC) in the power compartment of the Mantis in line with the applicable military standards. MPE was therefore asked to participate in pre-compliance testing work, undertaken at independent test laboratories to ensure such EMC compliance.

During the design process, MPE attended testing days to accurately establish and measure any electrical noise issues. Utilising a range of components and feedthrough products, MPE was able to best determine the correct circuits in order to ensure approvals against the demanding military EMC standards. This saved considerable time and cost as compared with a remotely conducted, iterative filter design process.



Pre-compliance EMC testing of the Mantis towing traverser

Mechanically the pre-compliance testing work also highlighted the very tight space constraints available to house any filter product. Based on the testing, full prototype units were then developed at MPE and supplied for final approval work.

The custom unit produced by MPE was a six-line, 7A 28V, DC filter based upon MPE's world-leading range of military vehicle filters. To date MPE has manufactured and supplied a significant volume of these filters for the power compartment of the Mantis.

For further information on MPE's high-performance equipment filters, visit www.mpe.co.uk/category/equipment-filters/ or to download a product overview brochure click here.