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CBNW

CHEMICAL, BIOLOGICAL & NUCLEAR WARFARE

Chernobyl is forever

SPECIAL FOCUS:
Medical countermeasures

FEATURED PRODUCT: NBC-Sys FRH16 First Responder Hood (page 18)

ISIS – Down but not out
TYPHOON – Protecting the pilots
DISMOUNTED KITS – Kitting out the warfighter

Protecting the PILOTS

David Bates of Martech rolls out chemical decontamination ground support for the Eurofighter Typhoon

The CDU is designed and manufactured at the Martech factory on Portland.

Preparedness is increasingly the watchword for our defence sector. It is important that our military is in a state of readiness at all times. The development and deployment of the Chemical Decontamination Unit (CDU) that now forms part of the ground support for the Eurofighter Typhoon,was done in anticipation of a chemical attack on the aircraft or in the airspace

Designed to meet a challenging requirement, the build needs to be repeatable and precise.

Specifically the units are designed to decontaminate the pilot's helmet and breathing apparatus, thus ensuring they are always safe and ready for use. The pilot's helmets are tailor-made and cannot be worn by other pilots.

Each helmet has an array of sensitive and expensive tech built into and onto it. Hence, it cannot be decontaminated using potentially damaging conventional methods such as high-temperature, detergents or fuller's earth and is not easily or quickly replaced. The CDU effectively maintains operational readiness of the equipment it is used to decontaminate while minimising cost and risk.

Requirement spec

Martech were asked by Dstl (Defence Science and Technology Laboratory) to design and build a demonstrator to prove a new decontamination process. This was successfully achieved. They then won the opportunity to design and build a production unit that would ultimately become a part of the ground support equipment for Eurofighter.

Quality interconnections are required to maintain the integrity of the solution.

CODA OCTOPUS MARTECH

Coda Octopus Martech (Martech) is a UK specialist design and manufacturing company based on Portland in Dorset. For more than 30 years, offering a team of skilled design engineers and on-site manufacture, Martech has produced a wide range of solutions. These give an indication of capability and how they could offer a solution to upcoming requirements.

Bespoke solutions can be offered for special/custom test equipment for production line, field and trials testing, obsolete technology replacements and reverse engineering, military vehicle systems, subsea and harsh environment, control and instrumentation, and sonar and signal processing.

The company has specialist knowledge in electronic systems design, software, embedded firmware and FPGA, NI Lab-View and bespoke solutions, 3D CAD modelling and mechanical design, electronic and mechanical system assembly, cable assemblies & wiring looms, and ISO 9001 and JOSCAR Hellios-accredited.

The Chemical Decontamination Unit developed to meet the requirements to be a portable unit for ground support operations.

The challenge was to design a unit that would perform the new chemical decontamination process effectively while being large enough to accommodate the helmet and associated accessories, including space for a hanging rail for the pilot's suit - yet be portable enough to be transported anywhere in the world while being robust enough to be able to survive any military environment.

Chemical Decontamination Unit

The decon process used in the Chemical Decontamination Unit (CDU) is a relatively simple and proven, safe, clean and effective method of removing chemical agents from sensitive high value, high-tech equipment. It requires certain physical parameters that had to be incorporated into the design.

This process and the control of the CDU was developed in conjunction with the UK's leading experts in chemical and biological protection at Porton Down.

Inherently clean and very gentle, the process does not use traditional methods such as high temperatures, radiated heat or any cleaning agents like as fuller's earth, detergents, foams or chemicals. The units themselves are intended for use in theatre and hostile environments, so the user interface has been designed to be very simple to operate and there are no additional facilities or resources required to maintain its operation, other than a standard 230V AC power supply and an already readily available military spec filter.

Inside there are special fittings including connectors for the pilot's breathing and demist hoses. These connectors are provided to ensure comprehensive decontamination of the items being cleaned.

The units themselves are manufactured in 316 stainless steel which is more resistant to general corrosion and pitting/crevices than conventional austenitic stainless steels. This offers higher creep, stress-to-rupture and tensile strength at elevated temperatures, and excellent corrosion resistance and strength properties. The steel is also painted in a high-spec chemically hard and self-healing paint. Hence, the CDU's construction meets the vigorous requirements of military air and road transport and can withstand extreme environments.

While there are other 'field-of-operation' challenges, the user interface on the CDU has been kept as simple as possible. This is integrated with a system to monitor and control the valves. The profile of operation is predetermined with no additional operator involvement.

The unit is also fitted with ports for interfacing with biological decontamination equipment, but to date this option has not been utilised.

The cleaning process

The decontamination process has a defined cycle duration and the design keeps this time to a minimum with an expected run-time of less than one hour. To ensure the process has been completely successful, there are external test ports that allow the introduction of chemical sensors to verify successful decontamination.

During operation, the system is fully sealed to prevent unnecessary external exposure to any contaminants that may be on the equipment. Utilising low-cost, readily available military-spec respirator filters, all subsequently removed contaminants are contained for disposal in line with standard military procedures.

CDU Control panel: an easy to use interface with control and status.

Deployment in theatre

The CDU has become an established part of the ground support capabilities of the Eurofighter Typhoon's member countries' operations. Now deployed in several strategic locations around the world, it supports preparedness for the possible eventuality of chemical attack.

Other applications

Designed specifically to allow sensitive, high-tech, high value equipment to be thoroughly decontaminated, the CDU technology and design can be scaled up or down to meet the decontamination requirements of a wide range of military operations. The CDU would be an effective tool for sanitising many types of military technology where potential contamination is a concern. Some high cost, high-tech or data sensitive equipment examples include micro-UAVs, weapons, night vision goggles and communication and surveillance equipment. The design is completely scalable and larger or more compact, portable solutions can be offered based on the same design.

David Bates is Business development Manager at Coda Octopus Martech Ltd.

ABOUT CODA OCTOPUS MARTECH

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ELECTRONIC & ELECTRO-MECHANICAL DESIGN & MANUFACTURINGPARTNERS

Martech, designs and manufactures custom technology for challenging applications in defence and aerospace, automotive and industry, including:

- New product development
- Production and field test equipment
- Legacy technology replacement

With over 30 years' experience Martech's skills and expertise encompass electronic and mechanical system design, sonar, control & instrumentation, signal conditioning and special test solutions.

With roots in UK defence research, Martech works with leading defence primes and tier-1 suppliers on a diverse range of end applications including military air, sea & land, commercial marine & subsea and other demanding industries. With in-house manufacturing capabilities, Martech are able to provide a complete turn-key service from concept through to prototype and beyond and are viewed by many of our clients as a vital part of their technical resource.

Capabilities

- Electronic systems design
- Software, embedded firmware and FPGA
- NI Lab-View and bespoke solutions
- 3D CAD modelling & mechanical design
- Electronic & mechanical system assembly
- Cable assemblies & wiring looms
- ISO 9001 accredited

Applications

- Special test equipment for production line, field and trials testing
- Obsolete technology replacements and reverse engineering
- Military Vehicle Systems
- Subsea and harsh environment
- Control and Instrumentation
- Sonar and signal processing

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