

Special Military Operators of MilDef products

Introduction

This white paper describes the requirements of Special Military Operators and how they benefit from a wide range of MilDef rugged products either within a mounted system or on a dismounted operation.

Special Operator requirements tend to be geared around Size, Weight and Power (SWaP) efficiency. This ensures that they remain agile, flexible, reactive, situationally aware and able to deliver their effect, but this shouldn't be at the sacrifice of certain standards which within the hostile environment in which they operate are critical to ensuring the Special Operator equipment can offer survivability and security.

In this white paper we will discuss different Special Operator requirements from Special Forces to Electronic Warfare operators. We will focus on the environment, mechanics, emissions and security needs to understand the commonality of requirements across the Special Operator community. We will not go in to the Special Operator's operations and tactics but concentrate on the difficulties from a product perspective to offer SWaP whilst complying with the requirements mentioned above.



MilDef develops rugged electronics for military applications. With reference cases from more than 20 countries and experience from over two decades of supplying mission-critical equipment, the company has collected a wealth of domain-specific knowledge.

The MilDef white paper series shares some of our proven solutions for digitalization, developed in close collaboration with our customers.

For more information, visit www.mildef.com.



What are Special Operators?

In the context of this white paper we are referring to military operators of electronic equipment within a specialist role. This could be Special Forces soldiers, Special Forces Communicators, Joint Fires Observers, Joint Terminal Attack Controllers, Electronic Warfare operators or any other specialist operating on the front line. These operators will have had to undergo additional or specialist training to support a role required within their organization.

In order to show some requirement and product examples we have categorized into Air, Maritime and Land.

Air

To date MilDef have supplied products that remain in operational use across numerous fixed and rotary wing platforms, ensuring capabilities such as Link 16 and other Tactical Data Links where operators only have seconds to identify a friend from foe before deciding whether to engage. Given today's high intensity conflicts around the globe, this market demands the most robust and technologically advanced products that perform reliably in the most demanding situations. MilDef continue to be selected by fulfilling these requirements and continuously drive forward through innovation and continuous engagement with the military user and defense community. MilDef's 19"/2 product range is fully customizable and utilizes a space envelope based on 1/2 of a 19" rack, thus saving size and weight whilst complying 100% with the Special Operator's requirements.



CS1100



ESW2124

Product Examples:

CS1100 Series Xeon Server	https://mildef.com/product/19-2-cs1100-series/
ESW2100 Ethernet Switch Series	https://mildef.com/product/19-2-esw2100-series/
RM200 Router Series	https://mildef.com/product/19-2-rm200-series/

Maritime

MilDef product can be found on a variety of maritime vessels ranging from Rapid Assault Craft to Naval Destroyers. One example of this is our fully secure, highly customised, TEMPEST certified RK12 Laptop Server for the Skynet 5 Satellite Communication in service on all Royal Navy ships as well as some land platforms. The Skynet 5 SatCom system provides reliable secure voice and data communications for combined NATO operations. A very different solution provided to the UK Special Forces is our DS13 Tablet PC which is fully exposed to the most extreme elements and harshest shock and vibration on a number of open deck assault craft.



Product Examples:

RK12 laptop with powerful Intel® quad core i7 CPU, up to 32GB of RAM and IP65 as standard even when the connector caps are open. For this requirement it has been customized with additional D38999 connectors, encrypted hard drives and built into a bespoke 19" rack docking tray.
<https://mildef.com/product/mildef-rk12/>

DS13 Tablet PC with Intel i7 CPU and a fully rugged design including IP67 sealing. The DS13 features a high-brightness 10.1" resistive multi-touch display, CNC milled lightweight aluminium chassis and a wide selection of customization options including military connectors, Night Vision Imaging System (NVIS) and wireless connectivity options.
<https://mildef.com/product/mildef-ds13/>



RK12



DS13

Land (dismounted)

In line with the success achieved in the Air and Maritime domain MilDef continues to excel within the Land environment for Special and Elite Forces by ensuring a 100% compliance to the operator's technical requirements. A strong example of this is with customization of 2 MilDef core products for an Electronic Warfare Capability, achieved through close liaison with the system integrator who strived to achieve high EMI performance and specific dismounted operator requirements.

Product Examples:

The RS13 Laptop customizations include 6 x discrete military-specified connectors, enhanced EMI shielding, Night Vision Imaging System (NVIS) and a custom power solution.

<https://mildef.com/product/mildef-rs13/>

The DF8A Handheld Tablet customisations include custom interface configuration and enhanced EMI shielding. All of which fell right into what MilDef do best, which is to meet our customer's high end specifications within budget and deliver in an aggressive timeframe.

<https://mildef.com/product/mildef-df8/>



DF8A and RS13



RS13 laptop showing custom military connectors

Land (mounted)

Special Operator equipment is not always used in the dismounted role. MilDef has recently supplied into a Special Forces communication system fully integrated to an open top wheeled vehicle. Due to the extreme requirements of integrating electronic equipment to an open military vehicle exposed to the elements wherever it may be deployed, MilDef had to ensure the ultimate level of ruggedization.

Product Examples

The system comprises of a 19"2 computer (CS379), Ethernet Switch (ESW453) and an 1P67 customized tablet PC (DS13).

CS300 Computer Series <https://mildef.com/product/cs300/>

ESW400 Ethernet Switch Series <https://mildef.com/product/19-2-esw400-series/>



CS379



ESW453

Hardware Requirements

Environment, Emissions, Mechanical

Special Operators need to operate within very challenging environments and the equipment they use for their specific roles are required to operate on Land, Sea and Air, in operating temperatures ranging from -45 to +55 degrees centigrade, high humidity, low and high atmospheric pressures, day and night operations.

Key to certain Special Operators is the reduction in any radiated emissions from devices carried during operations that could be susceptible to detection and or interception. This is critical to the user as not only could they be compromised but the consequences of a data security breach can be significant.

Depending on the role of the user, uncontrolled emissions from devices may also interfere with their sensitive equipment making it difficult to carry out their role and potentially providing incorrect data within their chain of command. For example, Signals Intelligence equipment is designed to detect emissions within frequency bands to assist with detection and intercept of unfriendly forces, if however, an untested or uncertified device was used to run the software then unmanaged emissions from the device could interfere with detected emissions.

The role of the Special Operator will define what product they need to deliver the objective of their mission, this may be dismounted or mounted or a mixture of both. They often need to interact or interface to software, sensors, communications, situational awareness systems and much more depending on the role and the effect they are delivering. Mechanically the devices or products are required to provide the service whilst complying to the environmental, emissions and security requirements but not at the sacrifice of SWaP, this is a key element of MilDef's capability and product strategy. The 19"/2 Small Form Factor products provide a product range from power solutions to Xeon Processors and can support server applications for Battlefield Management Applications, ISR, email etc to Software Defined Networking. MilDef's Laptop and Tablet range of products again support SWaP requirements but not at the sacrifice of the required test specifications. So mechanically MilDef deliver products into systems allowing the Special Operators to have the confidence that the devices they are using can provide survivability and comply to the standards ensuring that they remain on mission. Compliance to mechanical, environmental and emission standards may require the customization of the product from Mil-Std connectors to internal shielding, MilDef's experienced R&D department ensure that the compliance is built into the design and manufacture of the product.



High / Low Temp and humidity Chamber (-50°C to 150°C)



1 of 3 EMC Test Chambers

To meet these challenging requirements MilDef ensure that their products are designed and / or tested to:

MIL-STD-810G - this is a US Military test standard that ensures equipment is field-ready with a system of tests that simulate a variety of environmental conditions, including shock, vibration, temperature, humidity, altitude etc.

MIL-STD-461F - another US Military standard that defines the test standards and procedures for electromagnetic interference (EMI) for military equipment.

TEMPEST - Telecommunication Electronics Material Protected from Emanating Spurious Transmissions), this is a NATO certification which provides test limits on information systems through leaking emissions, unintentional radio or electrical signals, sounds and vibrations and provides guidance on how to shield against these threats.

IP (Ingress Protection) - MilDef support International Protection Marking IEC Standard 60529 on the products up to IP67 on most products making them ideal for exposure to the environments of the Special User.

DEF-STAN 00-035 - this UK Defence Standard covers environmental data and a range of tests representing environmental conditions which maybe encountered during the life cycle of the product.

DEF-STAN 59-411 - this is a UK MoD standard and defines the test methodologies to be used for measurement of the electromagnetic compatibility characterises to limit the propagation and coupling of unintentional electromagnetic energy whether conducted or radiated.

These certifications ensure that the MilDef design and manufacture equipment that can support the operational environment that the Special Operators must operate in. MilDef's design facilities incorporate EMC test chambers, IP test chambers, vibration chamber, drop test facility and high / low temperature test and humidity chambers.

COTS equipment maybe able to operate in part of this environment but is not guaranteed to deal with the dramatic drop in temperatures, pressures and water immersion on a constant basis as the operator moves from one area of operational theatre to another. Emissions standards on the COTS devices are not stringent enough for the operational environments in which they operate and could lead to ease of intercept.

Security

Security requirements for Special Operators are determined by the role and mission. MilDef has partnered with a number of specialist and government approved hardware and software encryption companies to provide various options to cater for all of these requirements. MilDef has solutions in service at various levels including SECRET and TOP SECRET as well as secure Android encryption. MilDef's facilities in Sweden and UK are authorised to handle government secured assets with relevant technical and support staff security cleared as appropriate.

Obsolescence Management

The Special Operator's equipment can be expensive and complex. In many cases the equipment can stay in operational use for many years. However, the computing market moves on quickly with chipsets and Operating Systems typically becoming obsolete within 2 to 3 years. MilDef, with its 100% focus on the defense market has an obsolescence process designed to specifically support these customer requirements. When a product is deemed to be close to end of life all customers are contacted and given a 6 month period in which to make a Last Time Buy. Once this period is complete MilDef guarantees 5 years of service support for all delivered product. In addition to this a new variant in the identical form factor but utilizing the latest technology is released. This enables the customer to upgrade their system with minimal impact to integration, training, ILS and allows seamless transition for the Special Operator.

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