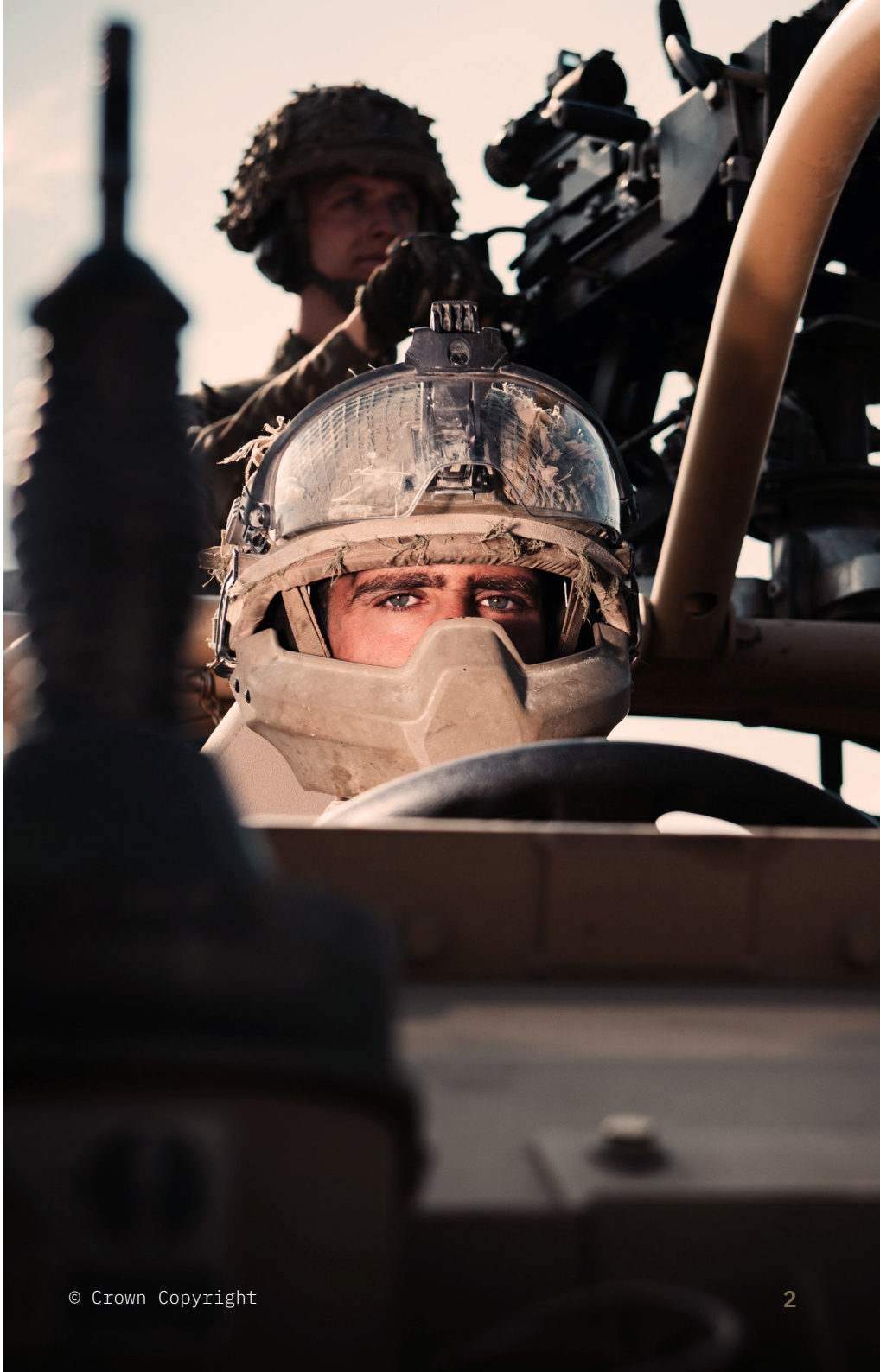
C5ISR

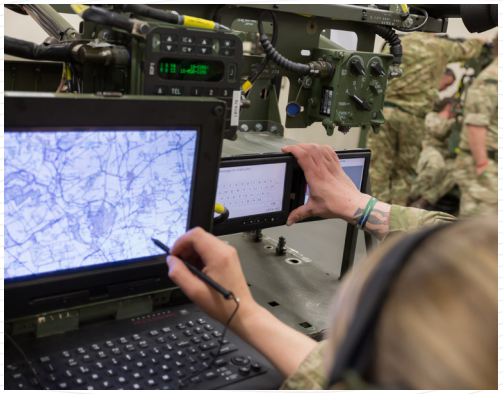
Integrating systems with systems, software, platforms and people

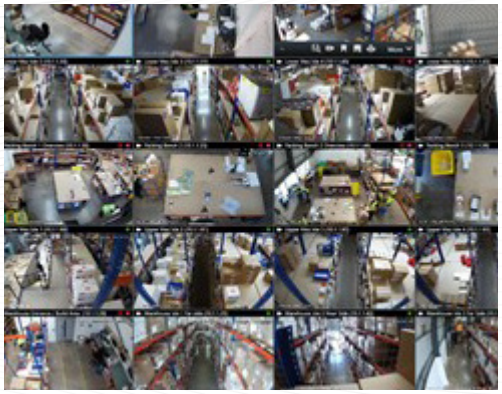
Drumgrange specialises in the tactical multi-domain integration of Shared Situational Awareness (SSA) capability for Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) in some of the most operationally critical areas of defence and security. This expertise starts with sensors for the collection of data, the passing of that data securely over one or more bearers – often across security domains, the integration of the data with extant systems such as battle management software, and where necessary the storage and analysis of that data. Data security is assured from the point of collection and maintained through transfer, integration, storage and analysis across multiple domains: land, sea, and cyberspace.

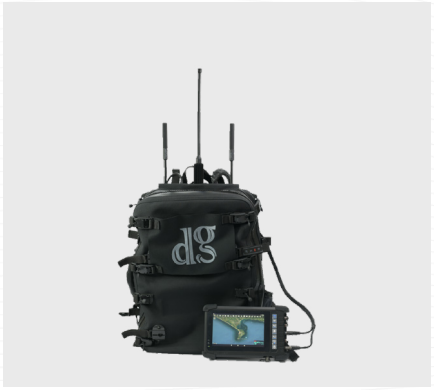
In addition to integration services, we also maintain and support all the complex C5ISR systems and capabilities we deliver.



Index







The Communications Simulation Range (ComSim)

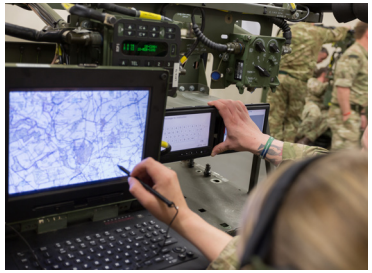
Controlled, repeatable and realistic Radio Frequency (RF) environment training solution for radio manufacturers and military end users. Ideal for testing, developing and demonstrating military radios in live, virtual or constructive environments across HF, VHF and UHF (L and S Band) frequency ranges from 1 MHz to 2.5 GHz*.

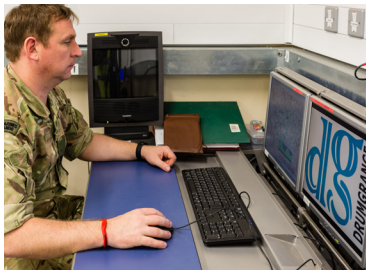
ComSim products are scalable from a simple 4-port attenuation matrix to a fully immersive 17-port collective training solution.

An operator or instructor controls the RF environment by automatically or manually setting the attenuation level between individual radios. ComSim replaces live RF links with physical links controlled by PC software, which adjusts the attenuation levels by simulating relevant degradation in the quality of communications depending on range, frequency and terrain. The flexible software and the ease in which users can generate different scenario-based testing procedures with minimal training makes ComSim suitable for use across the development lifecycle.

Available fully supported or as a COTS delivery with no support after the initial user training.

*with an extended range matrix



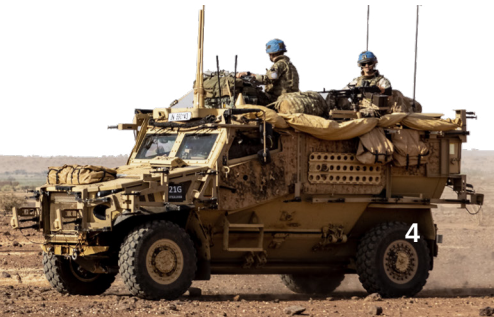


ComSim

- A comprehensive collective training solution for UK MoD Bowman Radio users
- 20 classrooms, each based on a ComSim Attenuating Matrix connecting live vehicle training aids
- Scenario-based exercises that allow trainees to maximise their learning time without needing to physically move their training aids.

Generic ComSim

- RF Simulator for radio manufacturers
- Physically connects off-the-shelf radios through a 4-17-port attenuation matrix
- Safe RF environment to run scenarios for radio comms within a lab, office or field environment
- Ideal for radio evaluation, testing and demonstration



Applications & Specification

ComSim Applications

Test & Development	ComSim allows radio manufacturers to test their radios in both a laboratory environment and in the field, making it ideal for early product development. Typically, a 4-port matrix allow 4 radios to be joined together.
Demonstration	Allows radio manufacturers and military end users to demonstrate and trial radio capabilities in a safe RF environment in the lab or in the field.
Training	Allows the integration of live radio assets onto a representative platform, creating a training aid that also provides connectivity to others to create a collective training environment controlled through one instructor PC.

Matrix Specification

Operating Frequency Range	1 MHz to 30 MHz 20 MHz to 450 MHz Continuous across frequency band
RF Impedance	50 Ohm
Number of ports for RF Attenuation Matrix	Up to 17, 1 per radio
Maximum Input Power (Rack)	1 Watt (30 dBm)
Maximum Input Power (System)	50W (47 dBm) with 20dB attenuators. Fixed attenuators are provided to allow the system to work at the required maximum radio output power.
System Insertion Loss	35-41 dB (nominal) at the connectors to the equipment rack.
Additional Variable Attenuation Range	≥ 100 dB in 1dB steps
Attenuation Accuracy between Ports	≤ ± 3 dB (for any port in any frequency) ≤ ± 2 dB (typical) ≤ ± 1 dB (for a repeated test)
System Isolation	> 160 dB
Rack Isolation	> 120 dB The included two 20 dB fixed attenuators gives end-to-end isolation of > 160 dB so two or more radios on the same frequency can be isolated from each other.
Programmable Noise Source	0 to ~ 30 dB Level above a nominal radio detection, set per radio

RF Passive Matrices

Designed for safe radio communication in a classroom or office environment, the Drumgrange RF Passive Matrices allow radios to communicate in a clear RF environment without the need to transmit to air.

Two types are available: one to cover HF/VHF frequencies and another to cover VHF/UHF ranges. The RF output from the radios is attenuated with fixed attenuators, reducing the power into the matrix to less than 1 Watt.

The matrices are already in service with the MoD and radio manufacturers, both in teaching and test laboratory settings.

2U MATRIX (FRONT)

2U MATRIX (BACK)

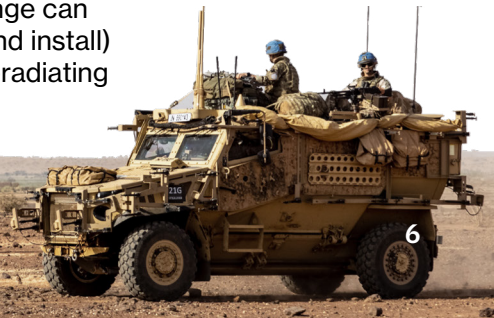
Key Features

- Wide frequency range: 1 MHz to 450 MHz (HF/VHF unit) and 10 MHz to 2.5 GHz (VHF/UHF unit)
- Low insertion loss (30 dB, nominal), the same between all pairs of radios.
- Allows 16 or 17 radios to communicate in a clear RF environment.
- Cascading matrices allows for a larger number of radios to communicate.
- Safe for indoor use with no transmission to air.
- No power requirements.

Applications

- **Radio Test Environment**
  The units are already installed and used within a radio Test and Reference Centre for the MoD. The centre provides an infrastructure for testing a large number of radios, allowing them to be connected quickly in isolated nets, communicating safely without transmitting to air.
- **Classroom Environment**
  The units are installed in a number of teaching establishments across the British Army, including at the Royal School of Signals, to alleviate the need for more expensive and time-consuming outdoor training.

Students can quickly learn to initialise the radios, practice voice procedure calls, and perform more complex net management functions. When used indoors with radios requiring a GPS signal, Drumgrange can supply (and install) a GPS re-radiating system.



Technical Specifications

HF/VHF Matrix

Frequency Range	1 MHz to 450MHz (continuous)
Impedance	50 Ohm
Insertion Loss	30 dB (nominal)
	Radios across cascaded ports have a nominal insertion loss of 60 dB
Maximum Input Power	1 Watt (30 dBm)
	Fixed attenuators are recommended to reduce the output power of the radios to an acceptable level
Number of Ports	16
Auxiliary Ports	2
	Auxiliary ports allow matrices to be cascaded, enabling more radios to communicate on the same net
Isolation	> 120 dB
Connectors	N-Type female on the rear of the unit
Weight	2.5 kg
Mounting	19” rack
Dimensions	483 x 200 x 88 mm
	(19” 2U high)
Power Requirements	None

VHF/UHF Matrix

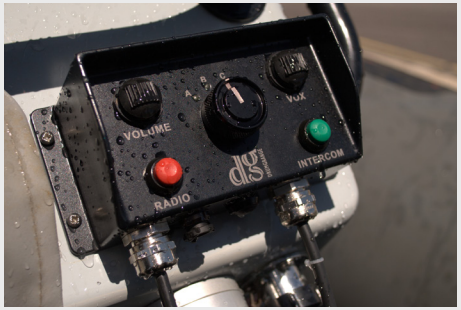
Frequency Range	10 MHz to 2.5 GHz (continuous)
Impedance	50 Ohm
Insertion Loss	30 dB (nominal)
	Radios across cascaded ports have a nominal insertion loss of 60 dB
Maximum Input Power	1 Watt (30 dBm)
	Fixed attenuators are recommended to reduce the output power of the radios to an acceptable level
Number of Ports	17
Auxiliary Ports	Any of the 17 ports can be used to cascade
	Auxiliary ports allow matrices to be cascaded, enabling more radios to communicate on the same net
Isolation	> 120 dB
Connectors	N-Type female on the rear of the unit
Weight	18 kg
Mounting	19” rack
Dimensions	483 x 365 x 267 mm
	(19” 6U high)
Power Requirements	None

Diamond Intercom & Radio Combiner System

Integrating multiple secure onboard radios into one easily navigable system, simplifying complex communications requirements.

Diamond provides crystal-clear voice connectivity between multiple users and onboard radios, both within the same platform as well as to and from other platforms. User-friendly, lightweight, and ergonomic, the system was designed for intuitive single-hand operation under high-speed transit at night, making it the ideal solution for land and maritime patrol craft and vehicles.

Driven by the toughest user requirements in the harshest of environments, Diamond balances intuitive functionality and ease of use with a robust, low-maintenance design. Crew and passengers can be confident of independent access to both secure and non-secure communications, uninterrupted intercom facilities and voice-activated communications. Its modular design and intuitive interface allows for rapid fault-finding and module replacement with no need for complicated and expensive diagnostic equipment.



USER NODE

COMBINER HUB

Key Features

- Designed for gloved, single-handed operation under high-speed transit
- User-specific VOX sensitivity control. User can personalise voice-activated comms at any time
- Designed to DEF STAN 00-035 Environmental Requirements
- Designed to DEF-STAN 59-411 and EN60945:2002 ACI:2008 EMC
- Each Hub can accommodate up to 8 users and 6 radios with an additional 2 configurable digital outputs
- Hubs can be daisy-chained together to increase the number of users on the network
- Lightweight with compact footprint
- Compatible with night vision goggles
- Willl remain Lights Out when required
- Headset-agnostic through the use of smart cables
- 8 user-defined audible alarm inputs
- Upgradable to allow for the integration of engine and system alarm, ensuring platform and crew safety

Technical Specifications

General

Audio Interfaces & Processing	High quality, digital audio (300Hz – 8kHz)
	User-controllable VOX function
Power	9-32 VDC 700 mA @ 12V
Weight (each)	Hub: 2.5 kg
	User Node: 0.7 kg
Aiding Message Formats	PDM2/3/4/5, PIDS, Synchro 36, 48, 64, 72, 96 kn/rev
Size (W x H x D)	Hub: 220 x 260 x 89mm
	Node: 100 x 120 x 40mm

Interfacing

Headset	Flexible headset options for different microphones and sensitivities
	Monaural or binaural options
Radio	Flexible radio input/output allows use of any radio
	Fully isolated analogue output to radio, audio and PTT lines
Alarm	8 user-definable audible alarms (spoken, tonal, etc.)

Storage & Operating Environment

Operating Temperature	-25°C to 55°C
Storage Temperature	-34°C to 70°C
Sealing	IP66 / IP67 Protected against dust, powerful water jets and temporary immersion in water
	Tested in accordance with DEF-STAN 00-035 Part 3, Issue 4, Test CL25, Blowing Dust and Blowing Sand 3 CL5
Random Vibration	Tested in accordance with DEF STAN 00-035, Issue 3, Part 3, Test M1 Annex A, Figure A26 + A27 - Light Vehicle - Material on Sponson or Installed in Hull, Tracked Vehicle - High Level Test (Vertical Level Only) Annex A, Figure A29 - Material Deployed in Ships Smaller than Mine Sweepers
Shock	Tested in accordance with DEF-STAN 00-035 Part 3, Issue 4, Test M3, Table 1

User Controls

Control Subsets on User Node

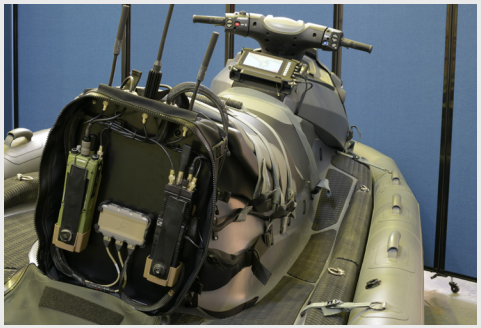
- Radio Selection
- Volume (Min/Max)
- VOX Sensitivity (PTT/Open)
- Push-To-Talk button (Selected Radio)
- Push-To-Talk button (Intercom)
- Illumination activation button to check radio selection

Walk-on-Fit (WoF)

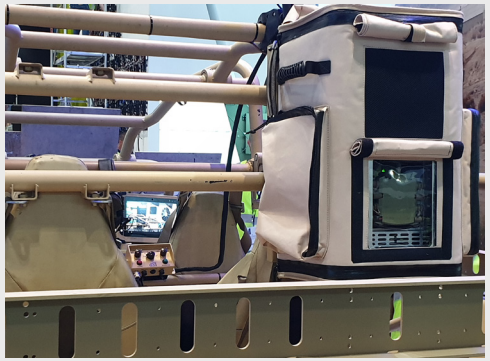
An integrated Shared Situational Awareness (SSA) system developed for rapid deployment on and off a wide range of land and maritime platforms, ruggedised for use within harsh environments.

Our secure pan-domain C5ISR systems can be scaled down from a deployable forward operating base, to fixed platform or integrated permanent vehicle fit, a Walk On Fit (WOF) or to a dismounted fit. The systems are equipped with rugged IT, secure encryption, remote and secure voice communications (both LOS and BLOS), interfacing cables and connections assured to IP68 standards, and tactical data links for inter-operability within land, maritime and air assets.

Ideal WoF applications include: Combined Arms Situational Awareness, Dismounted Shared Situational Awareness, surveillance and reconnaissance, training and simulation, counter insurgency, maritime interdiction, security and first responders.



MARITIME WOF



LAND WOF

Key Features

- Tactical data link for interoperability within land, maritime and air assets
- Scalable for man-pack configurations
- Secure voice communications within and beyond the line of sight (LOS/BLOS)
- Secure encryption and GPS
- MANET/MESH data and radio networking
- Live full motion video
- Compatible with unmanned air systems
- Open Architecture and future-proofed
- Silent watch capability
- IP68 interfacing cables and connections
- Shared Situational Awareness Applications (TAK)

Video Management Solutions

Tailored solutions for specialist areas of video capture & analysis and covert audio recordings.

Drumgrange is a trusted Advance Partner of Milestone Systems, offering consultancy, design, development, manufacture and integration services for the Milestone XProtect Video Management Software (VMS). Our core capability lies in the integration of Electro-Optic (EO) systems including high-performance surveillance cameras and security sensors into Milestone to enable real-time monitoring, threat detection, and enhanced situational awareness across defence environments.

MILESTONE XPROTECT

How it works

- The Milestone XProtect Corporate software is installed on VMware vSAN, a virtualised Dell Software Defined Data Centre (SDCC) which is a hyper-converged, software-defined storage (SDS) product.
- VMware pools together direct-attached storage devices across a VMware vSphere cluster to create a distributed, shared data store.
- The Milestone XProtect Corporate Software includes both hardware and software elements for video surveillance and information on VMware virtualisation.
- By running Milestone XProtect on a virtual environment or an SDCC, each Milestone VMS server role can be individually installed and memory-provisioned accordingly, ensuring maximum efficiency and performance.

What we bring

- A deep understanding of defence protocols, compliance, and operational needs
- Extensive experience working to meet various operational and security requirements
- Proven track record in deploying secure, mission-critical solutions
- Expertise in interfacing multiple EO sensors and third-party systems within secure VMS architectures
- Agile, collaborative delivery model suited to defence R&D and procurement pathways

Drumgrange at a glance

Established in 1979, Drumgrange is an independent, family-owned British engineering company specialising in the multidomain integration of electronics and communications systems. We deliver end-to-end solutions in operationally critical areas of defence and security, with expertise that spans the entire engineering lifecycle; from concept, research, design, development, testing, manufacture, integration, installation, in-service support through to obsolescence management.

Drumgange in numbers

45+	years of experience
80+	active projects
170+	employees
4	business streams
2	sites
>25M	turnover per annum

Areas of expertise

- Prime contract management
- System engineering and integration
- Electronic hardware and PCB design
- Software development, including real-time embedded
- Mechanical design and ruggedisation
- Simulation and 3D modelling
- Documentation and technical publications, including the provision of a handbook
- Technical studies and consultancy services
- Security accreditation and application of Secure by Design (SbD) principles
- Safety management, safety case production and Independent Safety Advisor
- In-service support
  - Integrated Logistics Support (ILS)
  - Contractor Logistics Support (CLS) and Contracting for Availability (CFA)
  - Post-Design Services (PDS)
  - Obsolescence Management & Resolution

Drumgrange Ltd © 2026
Unit A, The Forum, Hanworth Lane
Chertsey, Surrey, KT16 9JX
+44 (0) 1932 581100
info@drumgrange.com
www.drumgrange.com

PlanetMark Certified Business

EMPLOYER RECOGNITION SCHEME
GOLD AWARD
Proudly supporting those who serve.

JOSCAR REGISTERED

A member of ADS

CYBER ESSENTIALS CERTIFIED PLUS

UKAS MANAGEMENT SYSTEMS 0013
COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV
ISO 9001 • TickIT*plus*