



Global Communications Co.,

C4ISR GS-2200 Mobile System



Joint and combined military operations and multinational missions are driving the change from platform-centric operations to network enabled operations. Glocom supports ITCCS for stationary, mobile, shipborne, airborne and soldier with high-tech information technology with excellent communication technology. Hereby, the mobile system is designed for all kinds of vehicle applications in army.



C4ISR system is largely composed of sensors dedicated to tactical intelligence gathering, surveillance, and reconnaissance; a command and control system for accurate understanding of battle field situations on the basis of real-time information sharing and analysis, as well as rational decision-making and speedy transmission of orders; and a field management system comprising weapons management system, operation management system, etc., which encompass various kinds of combat equipment, personnel, and all other elements that take part in battles and wars either directly or indirectly.

ITCCS (Integrated Tactical Command & Control System) GS-2000 is an integral whole of various tools used for accurate understanding of battlefield situations, decision-making, speedy and correct implementation of tasks, and conduct of operational simulations and emulations.

At a glance

The Glocom mobile system GS-2200 is designed for mobile command & control applications in various kinds of civil and military vehicles. It belongs to a new generation of military information processing system that feature innovative designs, high modularity and in particular outstanding specifications.



New concepts for network operations

Network enabled operations in joint and combined military operation require new concepts for radio communications at sea, on land, and in the air. The mobile equipment and subsystems from Glocom fit seamlessly into the integrated onboard command, sensor, and effector network and in the wireless communication networks between allied units. In addition, flawless communications with mobile platforms and ground-based forces is ensured. Glocom's mobile system meets these mobile communications challenges using existing technology and new intelligent concepts.

System functions

- Position reporting on digital map
- Sharing of radar information
- Sharing of command & control information
- Real-time sharing of situation awareness information
- Remote control access via local area network
- Military operation planning, simulation & emulation
- Sharing of mission control data
- Evaluation/review of military operation

Benefits and key features

Unrivaled radio parameters

- Wide range of radio frequencies (1.6-2.4GHz)
- Excellent RF characteristics
- Robust design for unfavorable RF conditions
- Fully digital processing for RF

Flexible range of applications

- Free installation in anywhere
- Highly modular design enables scalable radio systems
- Local or remote operation
- Flexibility when selecting the voltage source (wide DC voltage inputs, AC power supply)
- Suitable for fixed, mobile, aircraft operated by air force, army and navy
- Software defined radio concept
- Wireless interface in range of ship

Secure communications

- EMP (ECCM) methods for anti-jam communications
- Tap- and spoof- proof communications through integrated encryption
- Methods for secure data transmission over TDMA based radio networks

Low maintenance efforts

- IP based maintenance tool
- Powerful built-in test (BIT)
- Automatic adaptation to ambient conditions
- Rugged design, suitable even for difficult environmental conditions - high reliability

Easy of operation

- Menu-oriented user interface and PC based tools
- Convenient and easy link establishment

Flexible and safe investment for the future

- Hardware and software upgrades
- Future changes in standards can be taken into account in product and program planning
- Low life-cycle costs

Unrivaled radio parameters

Wide range of radio frequencies

The Glocom radio supports the radio frequency from 1.6 to 2.4GHz which is very wide for all range of communication. It includes HF, VHF, UHF, 2.4GHz radio bands, and it combined in a system and managed by remote operator through network.

Excellent RF characteristics

The Glocom GR series radio family features excellent RF characteristics. The combination of analog and digital technology provides high signal purity that results in optimal transmission quality and extremely clear voice communications. Very fast frequency hopping in addition to compatible filter methods yield on optimal RF signal spectrum. This significantly reduces collocation influence that is typically caused by adjust transmit and receive stations.

The frequency generation in the Glocom GR series systems is performed by a special, state-of-the-art synthesizer module to provide spectrally-pure signals and to ensure high-quality radio links. Very rapid frequency generation and frequency setting enables the use of fast EPM(ECCM) waveforms without having to sacrifice the high quality of the RF signals.

Robust design for unfavorable RF conditions

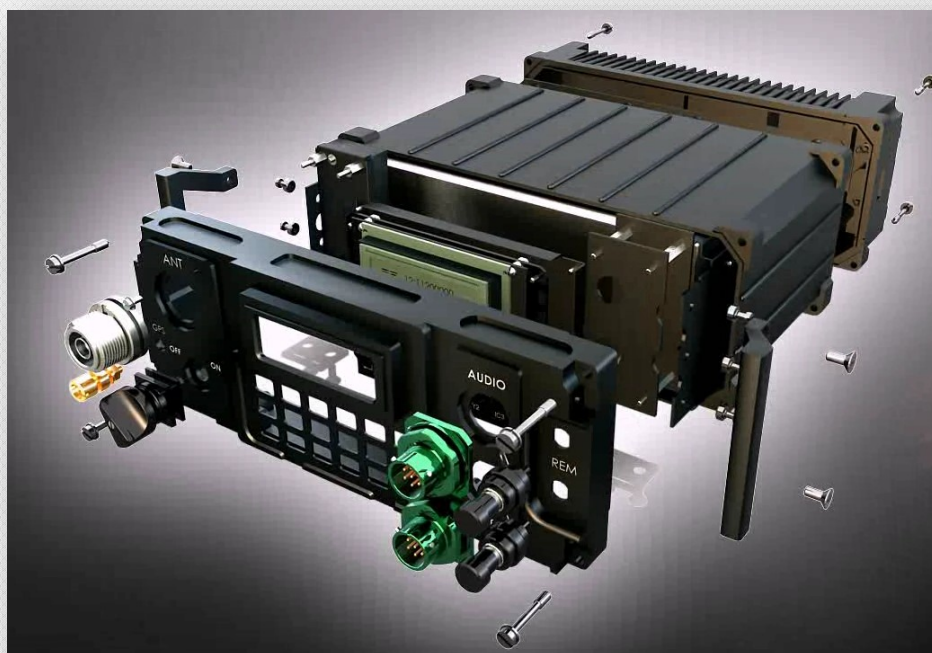
The Glocom GR series radio systems are prepared for operation in unfavorable RF environments. Even antennas that create a high voltage standing wave ratio (VSWR) can be connected without difficulty. The negative impact of high receive levels is compensated for by the excellent RF large-signal immunity, leading to outstanding voice and data transmission quality. Protection circuits prevents damage from occurring to the Glocom GR radio modules.

Modular design of the Glocom radio family

Fully digital processing for RF

The former version of Glocom HF radio GR-100 has combined the unmatched dynamic range of radios with analog mixers with the latest in digital IF and audio signal processing. The second IF frequency of 455KHz is sampled, digitized and processed using digital signal processors. This means that a wide range of IF bandwidths is available in all modes with high selectivity and optimized for voice and data communications. Digital signal processing also has provided functions for noise suppression.

But new version of Glocom HF radio GR-150 doesn't use any mixer or IF processing. It just converts the RF signal into digital signal using high speed and high resolution A/D converter. All processing of signal has been done by ultra high speed signal processor, so it is truly software defined radio which can be compatible with a variety of wave forms. Because of this excellent technology, Glocom radios are compatible with future oriented waveforms, and support unmatched wide dynamic range.



Flexible range of applications

Free installation in anywhere

The Glocom radios are designed to use in manpack, stationary, vehicle, ship borne and airborne. It can be installed in any 4-wheel vehicle, tanks, ships and airborne. Almost of radios are designed "jerk-and-run" concept, so it is very easy to configure vehicle system from portable version. If any vehicles are defective, it can take out just, and can be use in portable purpose.

Highly modular design enables scalable radio systems

Almost of the Glocom radios is using same radio casing, same modules for front panel module, keyboard module, DSP (digital signal processing) module, power supply module. Only differences are RF module and RF power module. In case of software defined radio, RF module is also same, because they are using same A/D converter module and DSP module. It supports great benefits for maintenance & logistics of radio system. The only difference is the software inside. It means the radios can be upgraded for new standards or application without any change of hardware, so we can support the update of radio in field environments. It means feature oriented system design for Glocom radios.



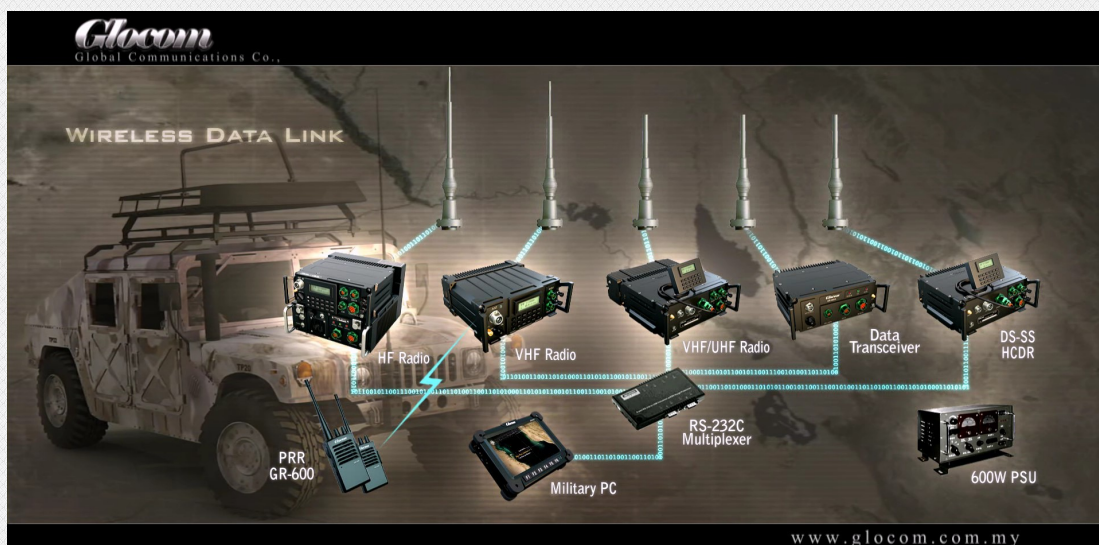
Portable version



Vehicle/Ship/Tank version

Local or remote operation

Almost of the Glocom radios is using same radio casing, same modules for front panel module, keyboard module, DSP (digital signal processing) module, power supply module. Only differences are RF module and RF power module. In case of software defined radio, RF module is also same, because they are using same A/D converter module and DSP module. It supports great benefits for maintenance & logistics of radio system. The only difference is the software inside. It means the radios can be upgraded for new standards or application without any change of hardware, so we can support the update of radio in field environments. It means feature oriented system design for Glocom radios.



Remote control by computer network

Flexible range of applications

Flexibility when selecting the voltage source (Wide DC voltage inputs, AC power supply)

All Glocom radios come with wide range of DC inputs. There are optional DC power supply adaptors, so it can be chosen according to the installation conditions. An external multi range AC power supply available from Glocom enables operation of the radio with conventional AC power grids. The AC power supply complies with current standards and contains active power factor correction. Supply voltage fluctuations are compensated for without affecting operation of the radio.

Suitable for fixed, mobile, aircraft operated by air force, army and navy

Military ship and aircraft place a variety of demands on the radio with respect to environmental impact such as g-force, vibration and temperature range. Furthermore, army, air force and navy platforms must sometimes support special applications in the variable frequency ranges. The Glocom radios offer a wide bandwidth to support a variety of applications.



Software defined radio concept

All software elements of the Glocom radio system, including the waveforms and software options, can be loaded into the radio as needed by using the A/S and maintenance tool. Numerous software packages are available for this purpose. This approach also allows functional enhancements to be loaded at a later time with this approach. That means existing software functions can be enhanced without opening the radio or replacing hardware modules.

The current status of the software is shown in a comprehensive inventory report, which contains the status of all versions of the software and its components.

Wireless interface in range of ship

The electric wiring in small space of air force, ship borne, vehicle would be brought on the intricate problems. Especially, electric wiring in air-tight space of air force is very difficult for modernization of old airborne and ships. The connecting the tactical terminal and equipment with individual solders of airborne, ship borne and special forces is also inconvenience and dangerous from them. Glocom supports the clear solutions using Wi-Fi technology. The wireless intercom system using wireless interface is very convenient in ship, vehicle and stationary, so it is very flexible to installation in field environment.



Shipborne communication system

Secure communications

EMP (ECCM) methods for anti-jam communications

Electronic protective measure (EPM) protect radio links from electronic countermeasures (ECM) such as jamming and unlicensed listening. Frequency hopping is an EPM (ECCM) method that is available as an standard in all Glocom radios. This function in other brand radios are an optional function which is very strict to permit, and very expensive. The frequency hopping algorithm is compatible with defacto-standard method like STANAG or MIL-STD. It is also available to be customized in accordance with the end user's requirements. These methods ensure a jam-free radio link in any environments. Glocom also developed the Glocom Intelligent Frequency Hopping (IFH) technology, which provides effective radio link use against active jamming even in confused frequency band. It can also encrypt voice and data transmission up to 1000bit/s. It has been tried and tested around the world for many year.

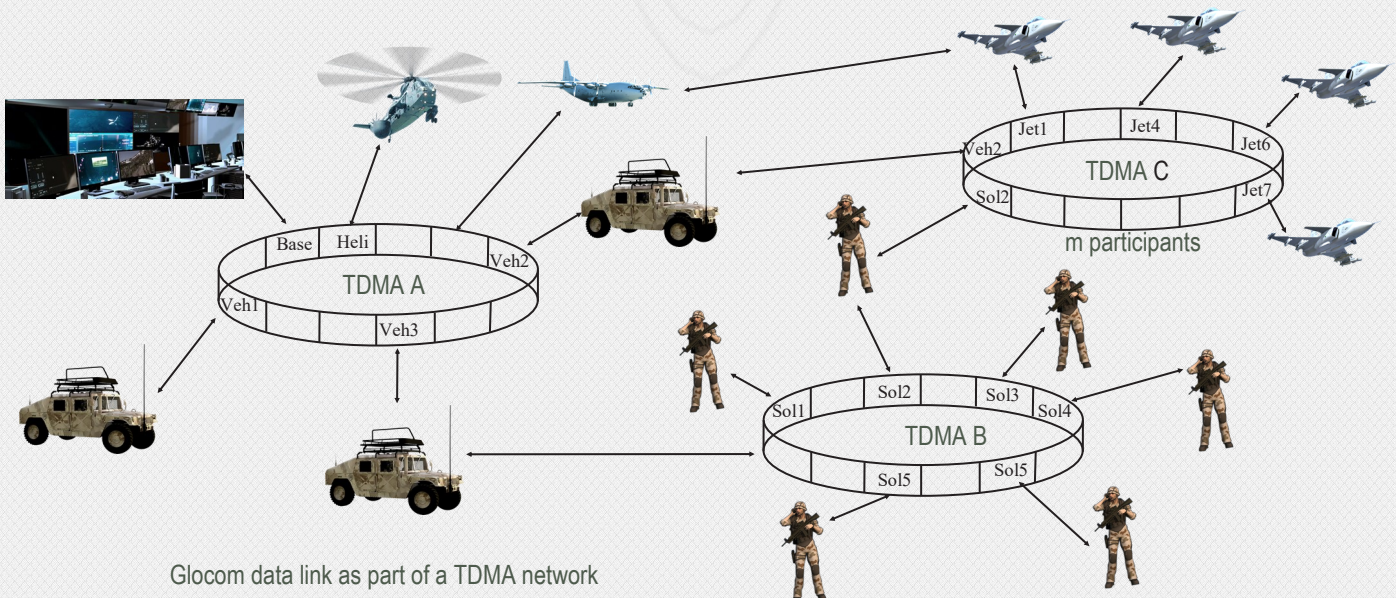
This method is integrated in Glocom radios, and it is open for the end customers to provide the flexibility to participate in national and international missions.

When using the Glocom frequency hopping technology method, voice communications are compressed by means of a MELP 1000, MELP 2000 or CVSD vocoder and then transmitted digitally.

Tap- and spoof- proof communications through integrated encryption

To protect radio links from tapping and spoofing, the information being transmitted can be encrypted. With Glocom radio family, Glocom was one of the first manufacturer to offer embedded encryption. It eliminates the need for an additional encryption device. The Glocom radio therefore saves space, reduce weight and is easy to install in the small space like ship, vehicle and aircraft. The encryption algorithm is also customizable by end user, so no need to worry for national compatibility.

The standard encryption method is compatible with defacto-standard like AES256. To load the encryption keys, different protocols are provided, like keyboard, computer or wireless fill-gun (OTAR).



Methods for secure data transmission over TDMA based radio networks

The following picture shows TDMA data link system which supports the secure data transmission for tapping and spoofing proof. It's a essential technology for the construction of C4ISR system .

Low maintenance efforts

The Glocom radios were developed with low maintenance effort in mind. A variety of control and monitoring functions are available that furnish the user with detailed status information about radios. In addition, built-in test functions permit service and maintenance tasks to be carried out in a targeted manner. The radio systems can be re-motely analyzed, eliminating the need for on-site service. Resistance to vibrations and a wide operating temperature range allow the systems to be used in diverse applications.

IP-based maintenance tool

The IP-based Glocom service and maintenance tool is a vital accessory for the Glocom radio systems. It works in any standard IP network, requires no additional cable or device drivers and is ready to be used on conventional laptop computers.

Wealth of useful functions are available that can not only track the status of the radios in detail, but also transfer configurations from one radio to another. This function, described as cloning, permits the fast, time-saving and error-free dissemination of radio-specific settings to the Glocom radio systems. Cloning makes it easier to replace a system with another system of the same type such as when service and maintenance is required. The Glocom service and maintenance tool is also used to load the radio software.

Rugged design, suitable even for difficult environmental conditions - high reliability

The Glocom radios feature a robust design and high quality components. The result is high MTBF. The radios are tested in accordance with various military and civil standard such as MIL-STD-461 and MIL-STD-810.

To Prevent damage, the devices automatically continue to operate at reduced power if overheating occurs. When the temperature normalizes, the device automatically returns to the original power level without manual intervention.

The military aviation sector demands a high level of device reliability, particularly in extreme environmental conditions. Whether they are exposed to high g-force in jet aircraft or to heavy vibrations in helicopters and transport aircraft, Glocom radios were designed for such operating environments. This is a key reason why the Glocom radios are deployed by air force, army and navy units around the world.

The MTBF achieved in practice is more than 50,000 operating hours.

Powerful built-in test (BIT)

In addition to the normal power-up BIT(PBIT) and continuous BIT (CBIT), the Glocom radio also features an initiated BIT (IBIT) for checking the receive and transmit functions of the system. The transmitter and receiver are tested simultaneously by means of an internal loopback that routes the transmitter signal directly back to the receiver. The radio then analyzes the signal in the receive side and documents any deviations. The IBIT can be carried out after expanding and reconfiguring the radio, following a software download or also in regular cycles, all without external test equipment.

Automatic adaptation to ambient conditions

When ambient conditions such as temperature, supply voltage or VSWR are outside the permissible range, the transmitter will decrease its own power stepwise in order to maintain operation as long as possible. If ambient conditions return to normal, the transmitter will revert to normal condition without requiring any manual intervention. The user is notified of this status via a message. The radio monitored by means of temperature sensors. Cooling levels are automatically adapted to the ambient conditions.



Maintenance & logistics equipment

Easy of operations

The Glocom radios offer many diverse functions that help ensure straightforward, secure, and error free operation. The functions are available via hierarchically structured menus and context-sensitive keypads. The well-thought-out concept and the arrangement of the control elements allow the intuitive control of the radio even under difficult conditions from outside.

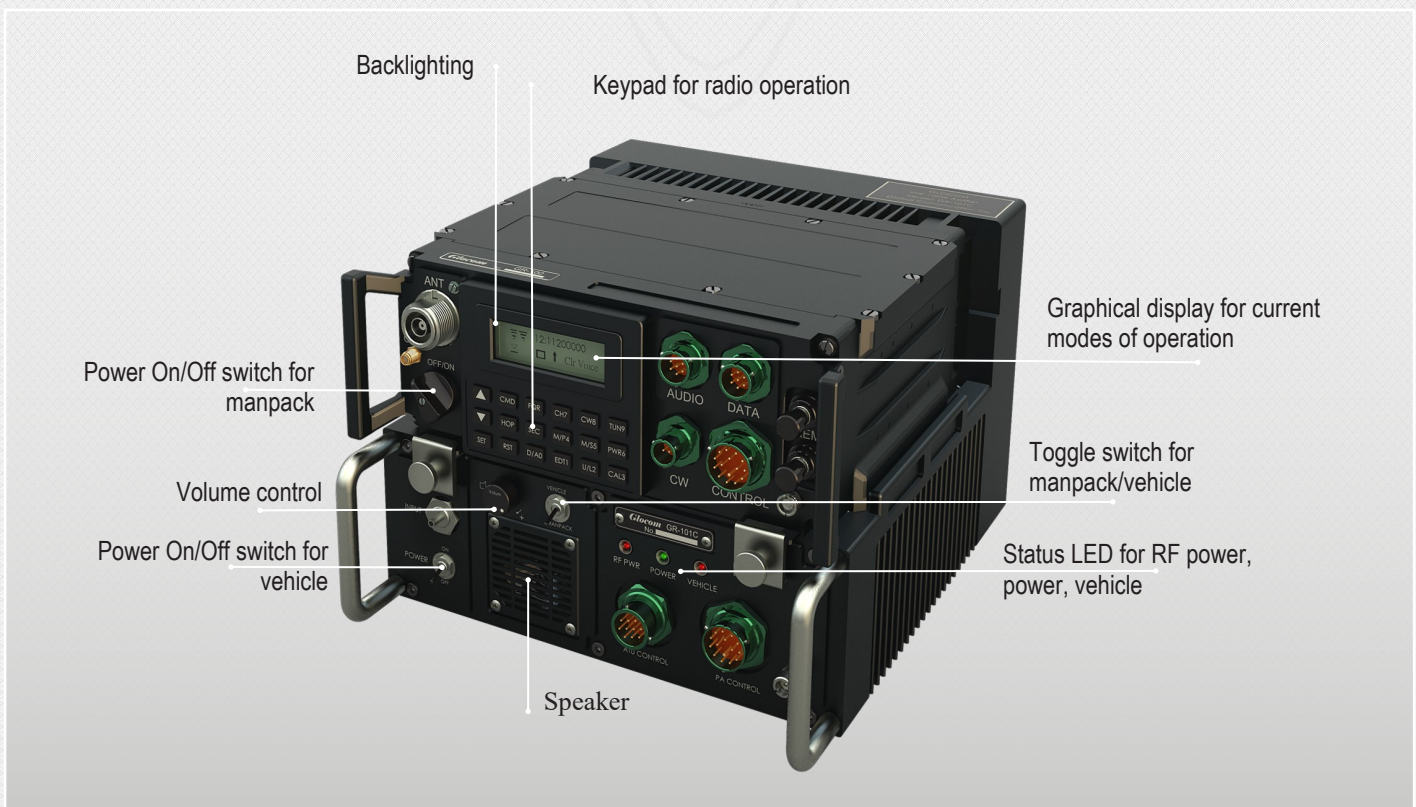
Menu-oriented user interface and PC-based tools

The user interface of Glocom radios is menu-oriented and easy to use. There is no any mechanical switches except power On/Off rotary switch. Most of functions can be setup using the keypad by one-touch concept. These modes contain the complete setting of parameters such as the transmit power, the channel frequencies, the link mode, the EPM (ECCM) procedure, encryption keys, and other net-specific adjustments. These preset pages are conveniently prepared with a PC or at a central location using GR-910 ITDS software, and are loaded into the radio over the data connector before a mission starts.

Convenient and easy link establishment

The setup of the main functions like mode exchange, link establishment and SMS is very convenient and easy compare other brands. The operator chooses and press the proper keypad, and one more press after ensure, and everything else is done automatically. The result is reported with sound and display, so the operator can ensure the current mode.

For example, the radio modes of all slave radios in a net will be changed automatically, if the master radio is going to change the working mode. It is very convenient feature for the user, so any beginner can use Glocom radio after 1-2 hours training.



Flexible and safe investment for the future

Hardware and software upgrades

- HF modems STANAG 4285, STANAG 4415, STANAG 4539, Annex B, MIL-STD-188-110B
- ALE, 2nd generation, MIL-STD-188-141B, App. A+B
- ALE, 3rd generation STANAG 4538 (fast link setup)
- Data link protocols LDL, HDL from STANAG 4538 (without IP interface)

Future changes in standards can be taken into account in product and program planning

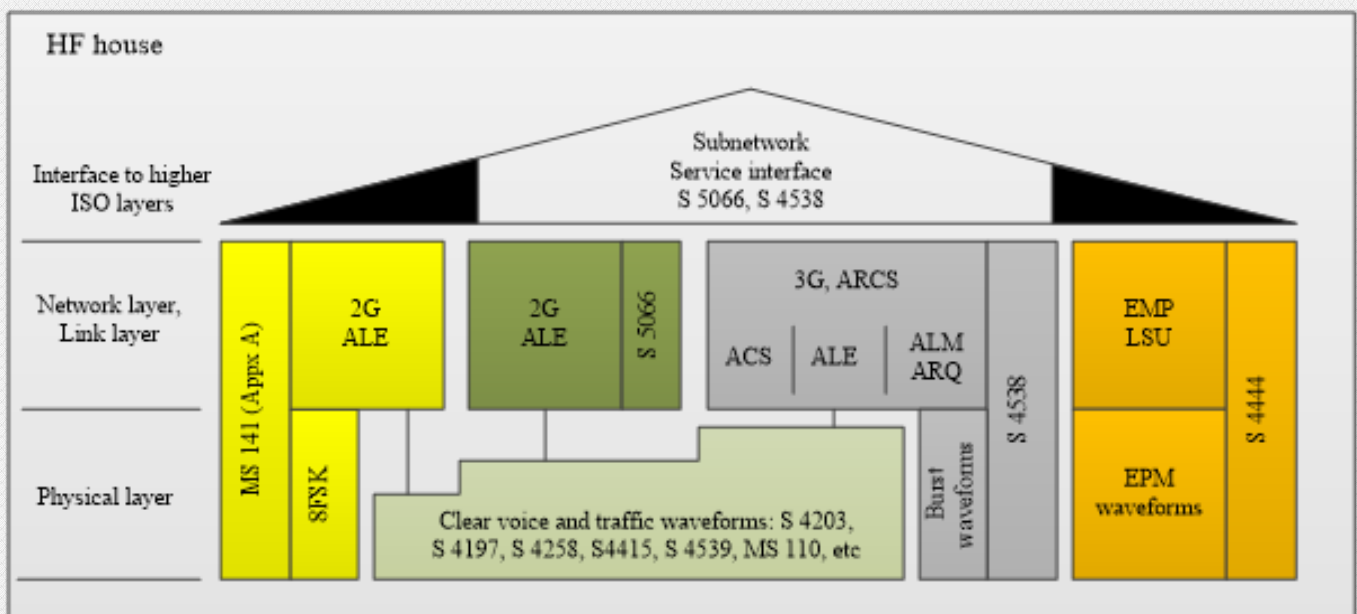
For example, the “HF house” is a structured overview of different HF standards that have been ratified by the developed countries. There are living standards which are revised at regular intervals. These changes are taken into account as part of the product and program planning for the Glocom radios and provided to customers in the form of software updates.

Low life-cycle costs

- User-friendly operating concept reduces training costs
- High MTBF and low MTTR value (<30min)

The Glocom radios contain less modules and components than a conventional radio since almost all of the functionality is implemented using embedded software. This considerably simplifies the supply and warehousing of spare parts. Problem with obsolete hardware modules are now a thing of the past. Radios with older software versions can be upgraded simply by downloading new software. The different standards that make up the “HF house” also available for Glocom radio family.

STANAG 4203	Technical standards for HF radio equipment
STANAG 4415	Robust waveform, 75bit/s
STANAG 4285	Single tone modem, up to 3600bps
STANAG 4529	Single tone modem, up to 1800bps
STANAG 4539	Single tone modem, up to 12800bps
MIL-STD-188-110A/B	Single tone modem, up to 12800bps (STANAG 4539)
MIL-STD-188-141A/B	Automatic link establishment
STANAG 5066	Profile for HF radio data communications
STANAG 4538	Automatic radio control system (ARCS)
STANAG 4444	HF show hopping waveform



The GR series radios offer military customers a wide range of interfaces and associated proprietary frequency hopping waveforms, as well as radio communications schemes that conform to military standards like STANAG & MIL-STD. Military data transmission methods such as data link systems are also supported. To ensure that existing GR series radio systems remain in up-to-date, their functionality can be enhanced through subsequent software downloads and, if necessary, by using new hardware modules. With this range of functions, the GR series radio family serves as a seamless communications equipment between the various military forces and civil units.



GR-150
HF 20W EPM Radio



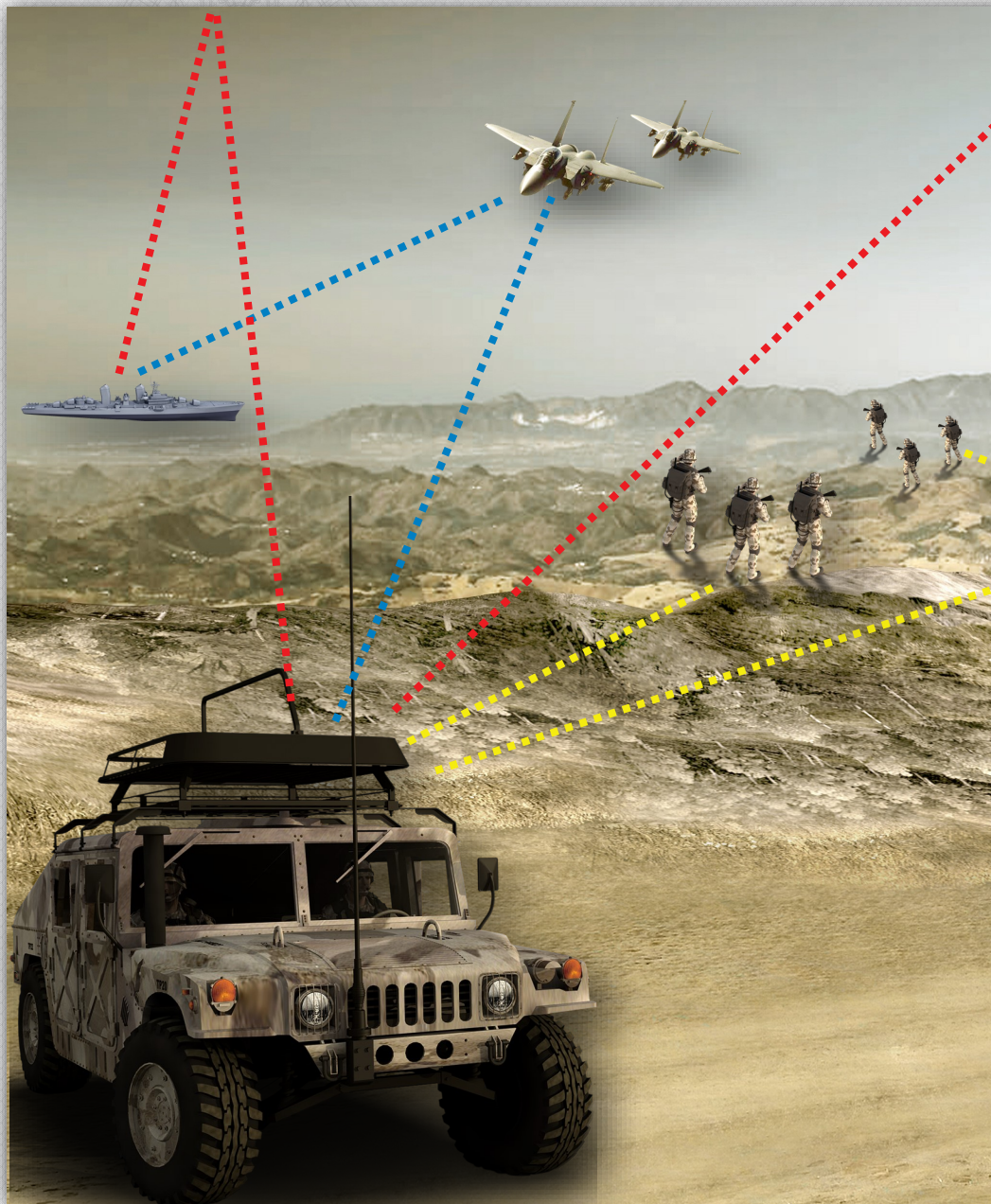
GR-151C/GR-102C
HF 100W Amplifier



GR-250
VHF 10W Radio



GR-400
UHF 10W EPM data radio



HF link



VHF/UHF(FM/AM) link



VHF(FM) link



GR-310
VHF/UHF 10W Radio



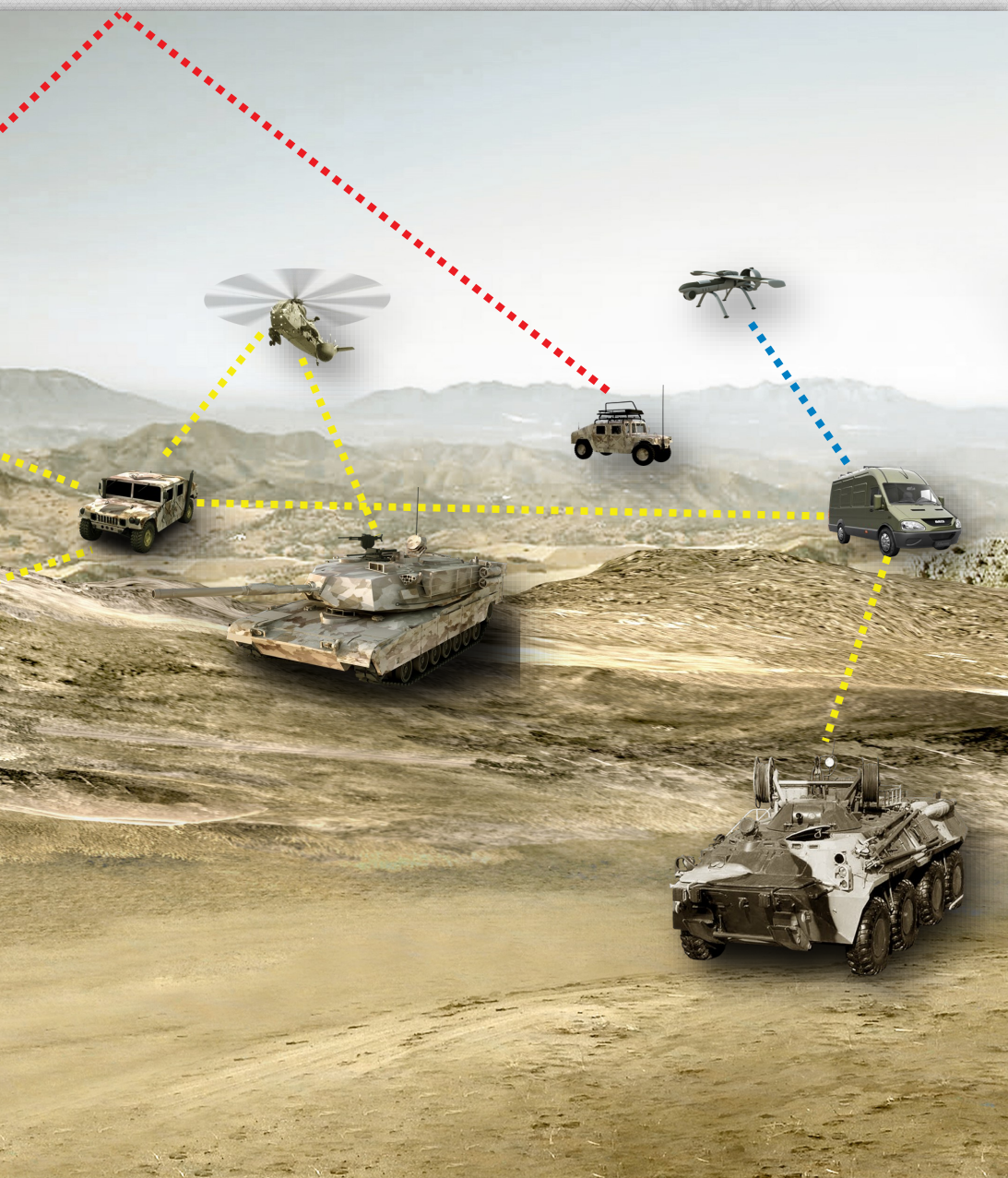
GR-313
Remote Control Unit



GA-114
NVIS Antenna



GR-500
UHF 10W HCDR



GR-611
SRR



GR-103
RCU



Installation Kit



Stationary



Mobile



Shipborne



Airborne



Soldier

➡ From digitized vehicle mission system...



Vehicle status



Local Situation Awareness (LSA)



Shared Situation Awareness (SSA)

➡ ... to battlegroup system integration and networking

Combat vehicle



Mounted & dismounted soldier



Reconnaissance, surveillance, target acquisition vehicle



Indirect fire support



Command post vehicle



Major References (Integrated vehicle & mission systems)

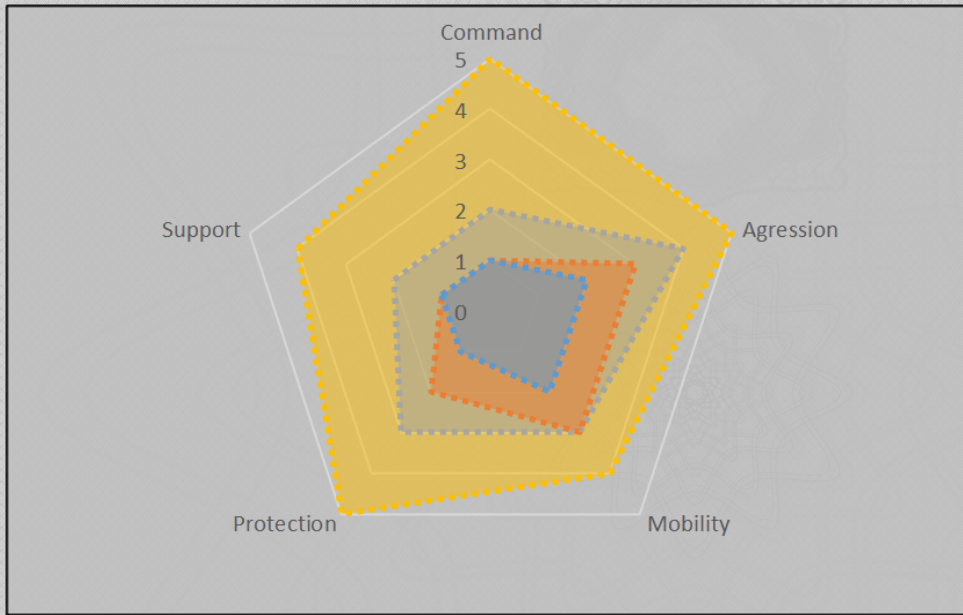
An open industrial organization, from mission package supplier to design authority for prime contractorship.
Local support to provide know-how and minimize risk.

➡ Provide shared situational awareness and assist operator in its mission execution.

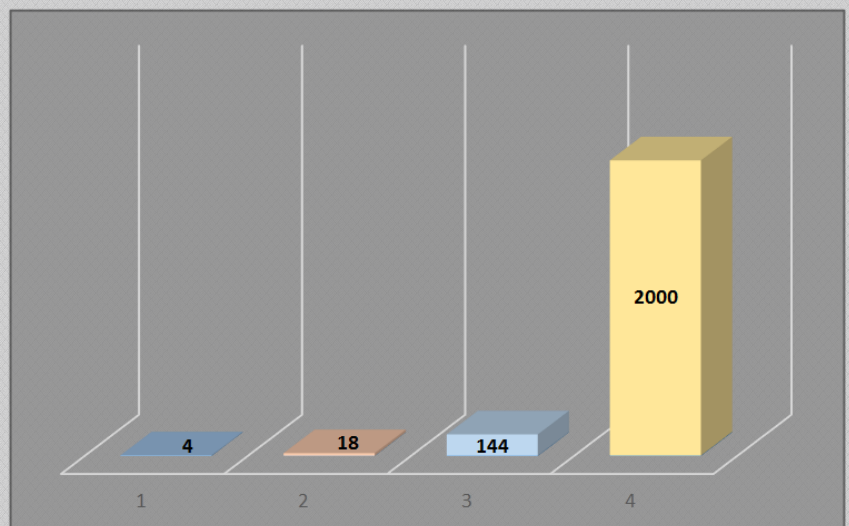
Legacy vehicles and most new-generation land platforms are seldom ready to plug into the digitized battle space. This calls for a coherent vehicles electronics architecture to allow best integration, networking and exploitation of legacy and new sensor, vehicle, and weapon data on board.

On this vehicle electronics system (or systronics) core, an overall vehicle and communications supervision enables network-centric operations of the whole battle group as an integrated system.

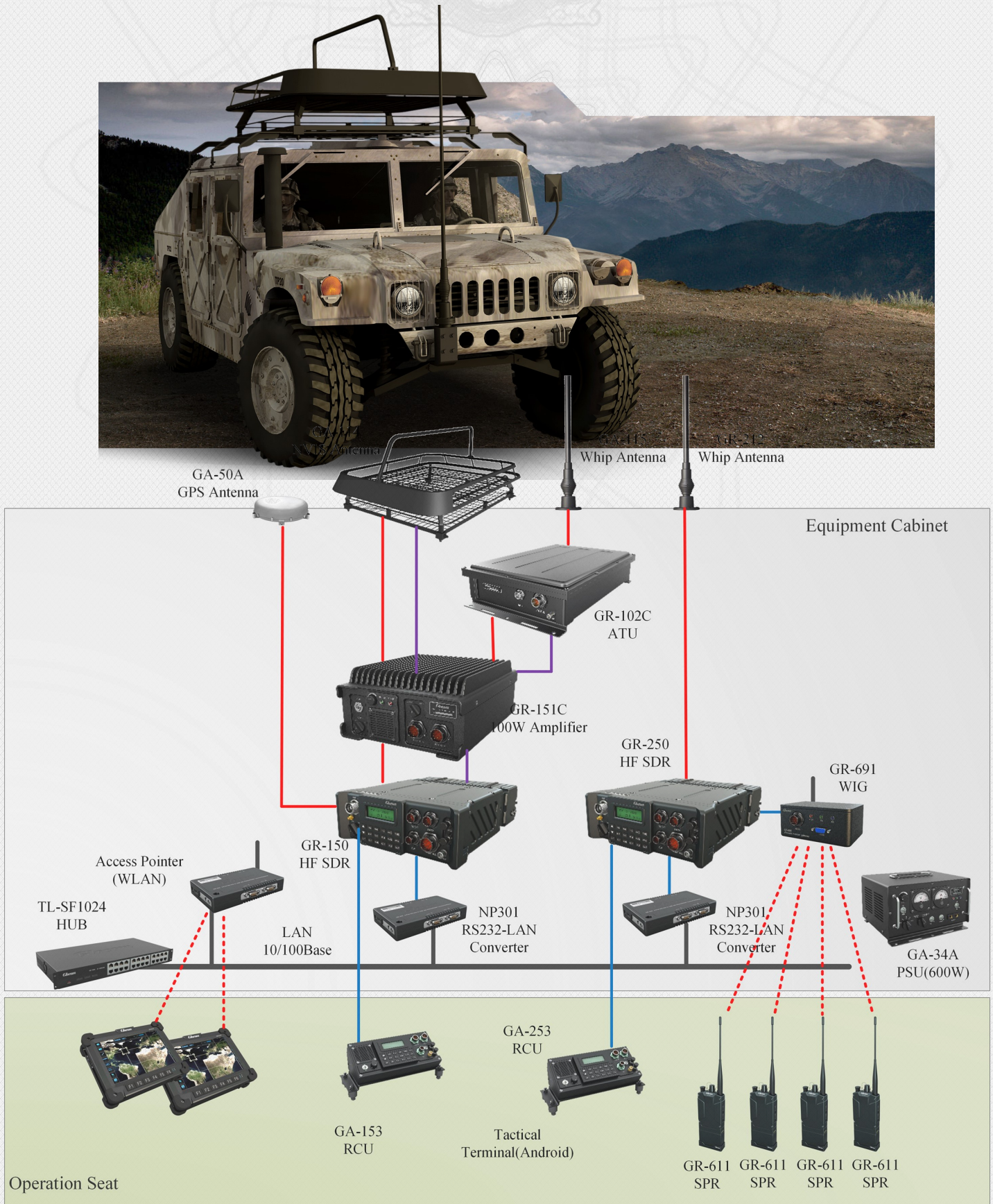
To measure the force multiplication factor and augmented situational awareness provided by vehicle digitization and multi-vehicle networking, NATO has defined new metrics beyond the traditional mobility, protection and firepower.



No	DESCRIPTION	Command	Agression	Mobility	Protection	Support	Total
1	Normal vehicle	1	2	2	1	1	4
2	Legacy or new vehicle (platform and main weapon) The best protected, most mobile and powerful vehicles remain vulnerable when they fight alone or using only voice orders.	1	3	3	2	1	18
3	Single vehicle digitisation mission systems (enabling equipment integration) Digitized platform with vehicle electronics system can best exploit equipment integration and deliver enhanced local awareness.	2	4	3	3	2	144
4	Multi-vehicle networking (multi-mission integration and link to command & control chain) Sharing vehicle and tactical information allows synchronized manoeuver, accurate logistics, collaborative fighting and decision superiority.	5	5	4	5	4	2000

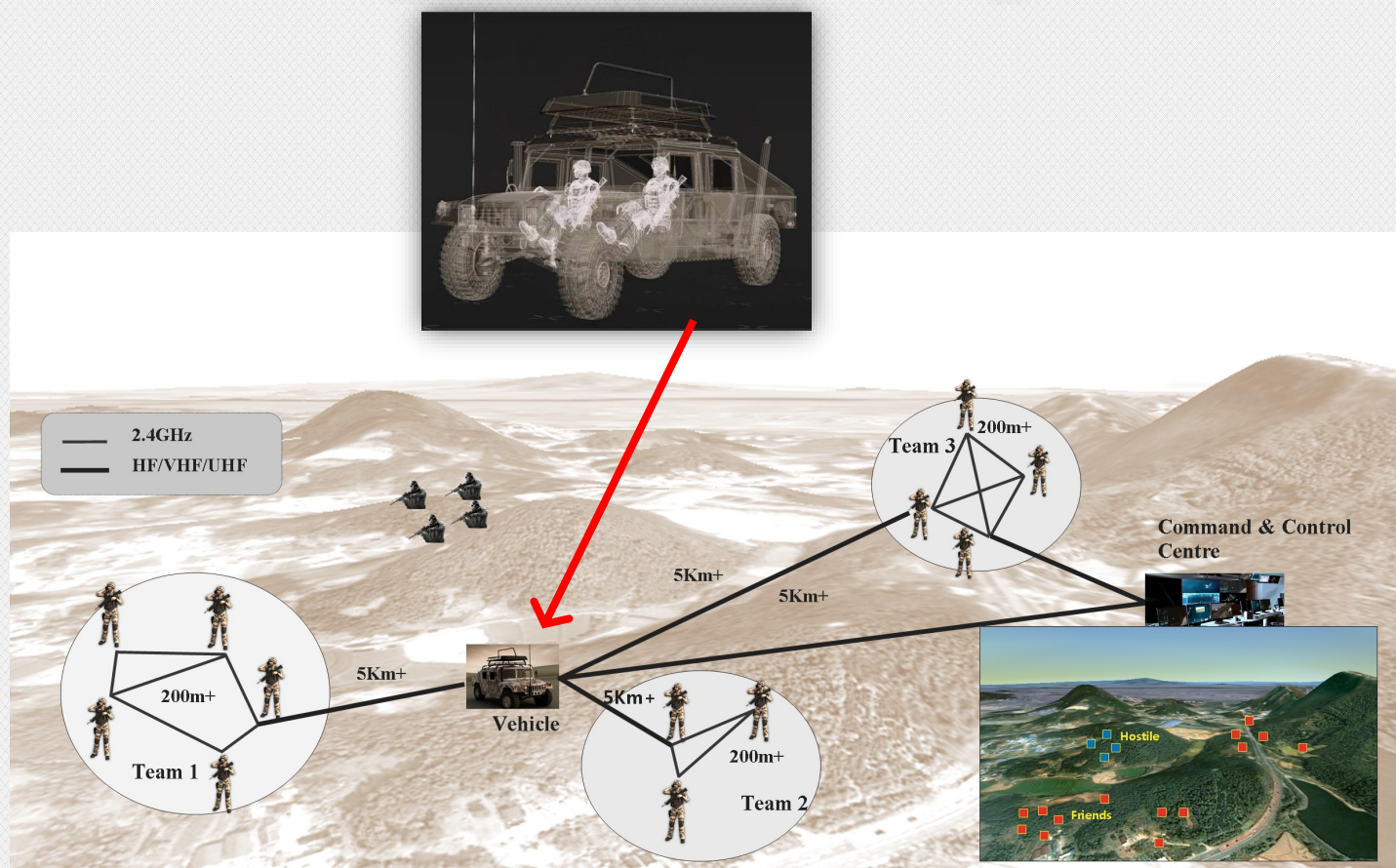


GS-2200-01 "Dove" C4ISR Mobile System (Small)

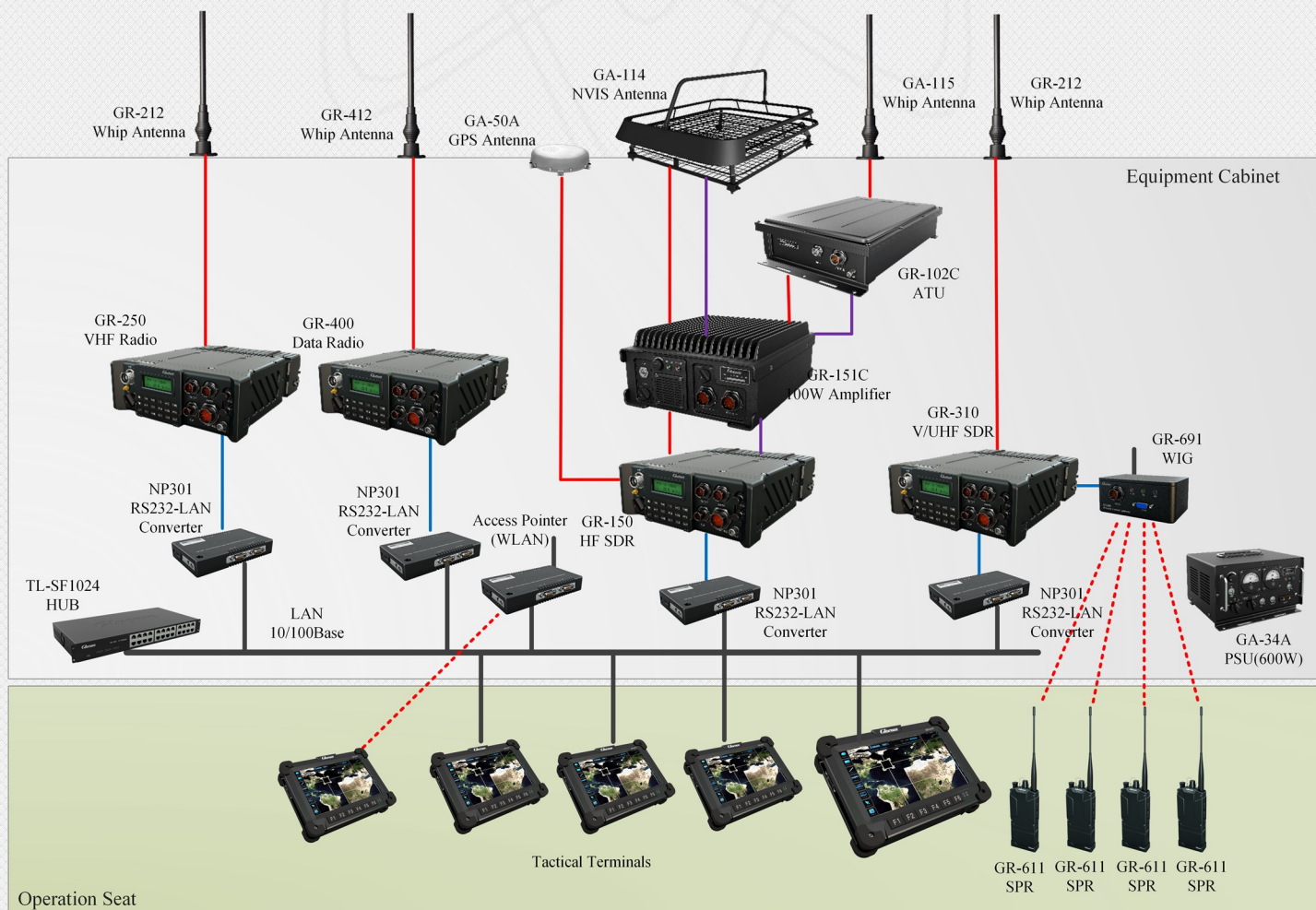


Ordering Information

Nº	DESCRIPTION	MODEL	BRAND	UNIT	QTY
1	HF EPM SOFTWARE DEFINED RADIO SET	GR-150E	Glocom	Set	1
1A	100W RF AMPLIFIER SET	GR-151C	Glocom	Set	1
1B	100W AUTOMATIC TUNING UNIT SET	GR-102C	Glocom	Set	1
1C	HF RADIO ACCESSORIES		Glocom	Set	1
2	VHF EMP SOFTWARE DEFINED RADIO SET	GR-250E	Glocom	Set	1
3	UHF SECURE PERSONAL RADIO SET	GR-611E	Glocom	Set	5
4	WIRELESS INTERCOM GATEWAY	GR-691	Glocom	Set	1
5	TACTICAL DATA PROCESSING SYSTEM		Glocom	Set	1
6	POWER SUPPLY SYSTEM		Glocom	Set	1
7	VEHICLE INSTALLATION KIT	GR-101C10-ITK	Glocom	Set	1



GS-2200-02 "Owl" C4ISR Mobile System (Medium)

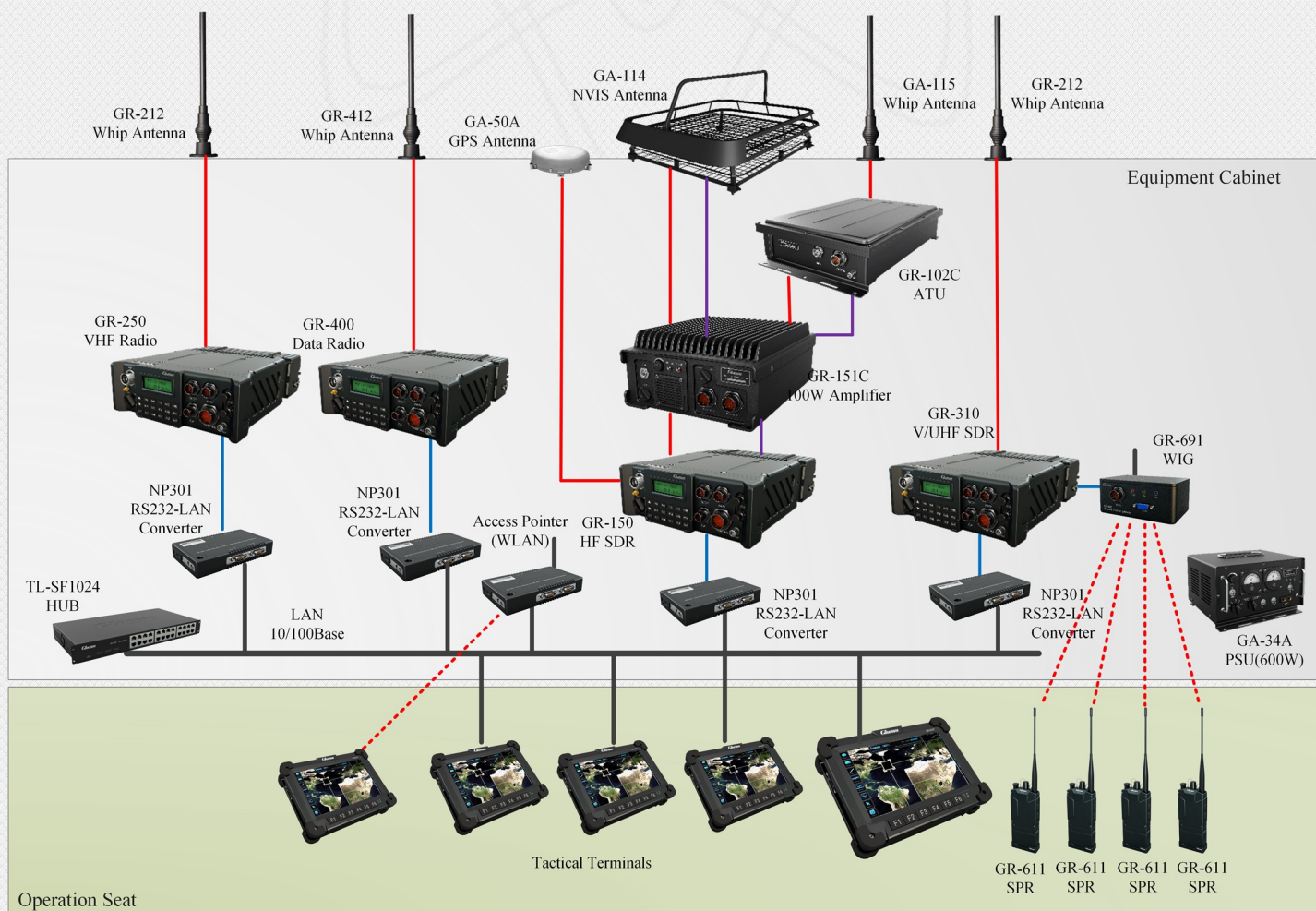
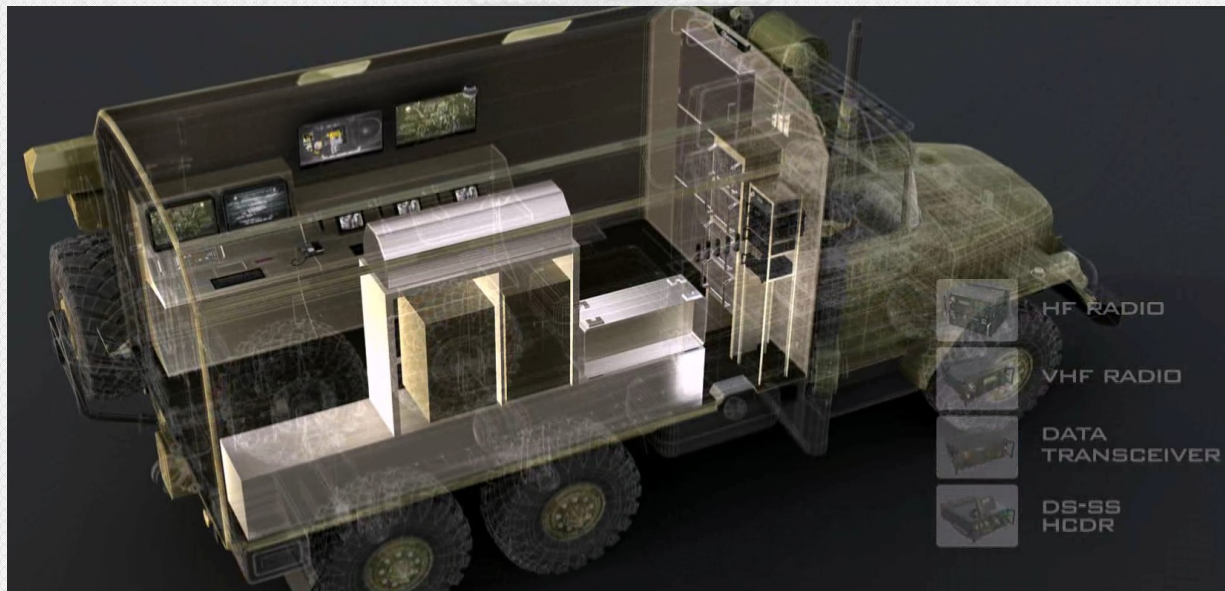


Ordering Information

Nº	DESCRIPTION	MODEL	BRAND	UNIT	QTY
1	HF EPM SOFTWARE DEFINED RADIO SET	GR-150E	Glocom	Set	1
1A	100W RF AMPLIFIER SET	GR-151C	Glocom	Set	1
1B	100W AUTOMATIC TUNING UNIT SET	GR-102C	Glocom	Set	1
1C	HF RADIO ACCESSORIES		Glocom	Set	1
2	VHF EMP SOFTWARE DEFINED RADIO SET	GR-250E	Glocom	Set	1
3	VHF/UHF EPM SOFTWARE DEFINED RADIO SET	GR-310E	Glocom	Set	1
4	UHF DATA RADIO	GR-400E	Glocom	Set	1
5	UHF SECURE PERSONAL RADIO SET	GR-611E	Glocom	Set	10
6	WIRELESS INTERCOM GATEWAY	GR-691	Glocom	Set	1
7	TACTICAL DATA PROCESSING SYSTEM		Glocom	Set	1
8	POWER SUPPLY SYSTEM		Glocom	Set	1
9	VEHICLE INSTALLATION KIT	GR-101C10-ITK	Glocom	Set	1



GS-2200-03 "Eagle" C4ISR Mobile System (Large)



Ordering Information

Nº	DESCRIPTION	MODEL	BRAND	UNIT	QTY
1	HF EPM SOFTWARE DEFINED RADIO SET	GR-150E	Glocom	Set	1
1A	100W RF AMPLIFIER SET	GR-151C	Glocom	Set	1
1B	100W AUTOMATIC TUNING UNIT SET	GR-102C	Glocom	Set	1
1C	HF RADIO ACCESSORIES		Glocom	Set	1
2	VHF EMP SOFTWARE DEFINED RADIO SET	GR-250E	Glocom	Set	1
3	VHF/UHF EPM SOFTWARE DEFINED RADIO SET	GR-310E	Glocom	Set	1
4	UHF DATA RADIO	GR-400E	Glocom	Set	1
5	UHF SECURE PERSONAL RADIO SET	GR-611E	Glocom	Set	10
6	WIRELESS INTERCOM GATEWAY	GR-691	Glocom	Set	1
7	TACTICAL DATA PROCESSING SYSTEM		Glocom	Set	1
8	POWER SUPPLY SYSTEM		Glocom	Set	1
9	VEHICLE INSTALLATION KIT	GR-101C10-ITK	Glocom	Set	1



MEMO

MEMO



Global Communications Co.,



Command System



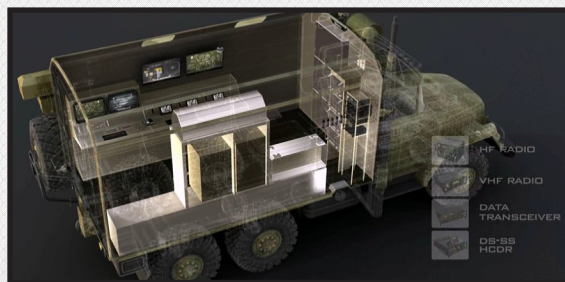
Jeep System



Tank System



Combat car System



- Tactical manpack radio systems
- Tactical handheld radio systems
- Stationary systems
- Mobile systems
- Airborne systems
- Shipborne systems
- Soldier systems
- BMS applications

Communications solutions for anywhere, anytime in battlefield

Global Communications is a leading supplier of secure voice and data communications products, systems and networks to military, government and commercial organizations worldwide.

Glocom is an international communications and information technology company serving government and commercial markets in more than 50 countries. The company has annual revenue of over \$15 million and 200 employees—including nearly 100 engineers and scientists. Glocom is dedicated to developing best-in-class communications products, systems and services. Additional information about Global Communications is available at Glocom website www.glocom-corp.com.