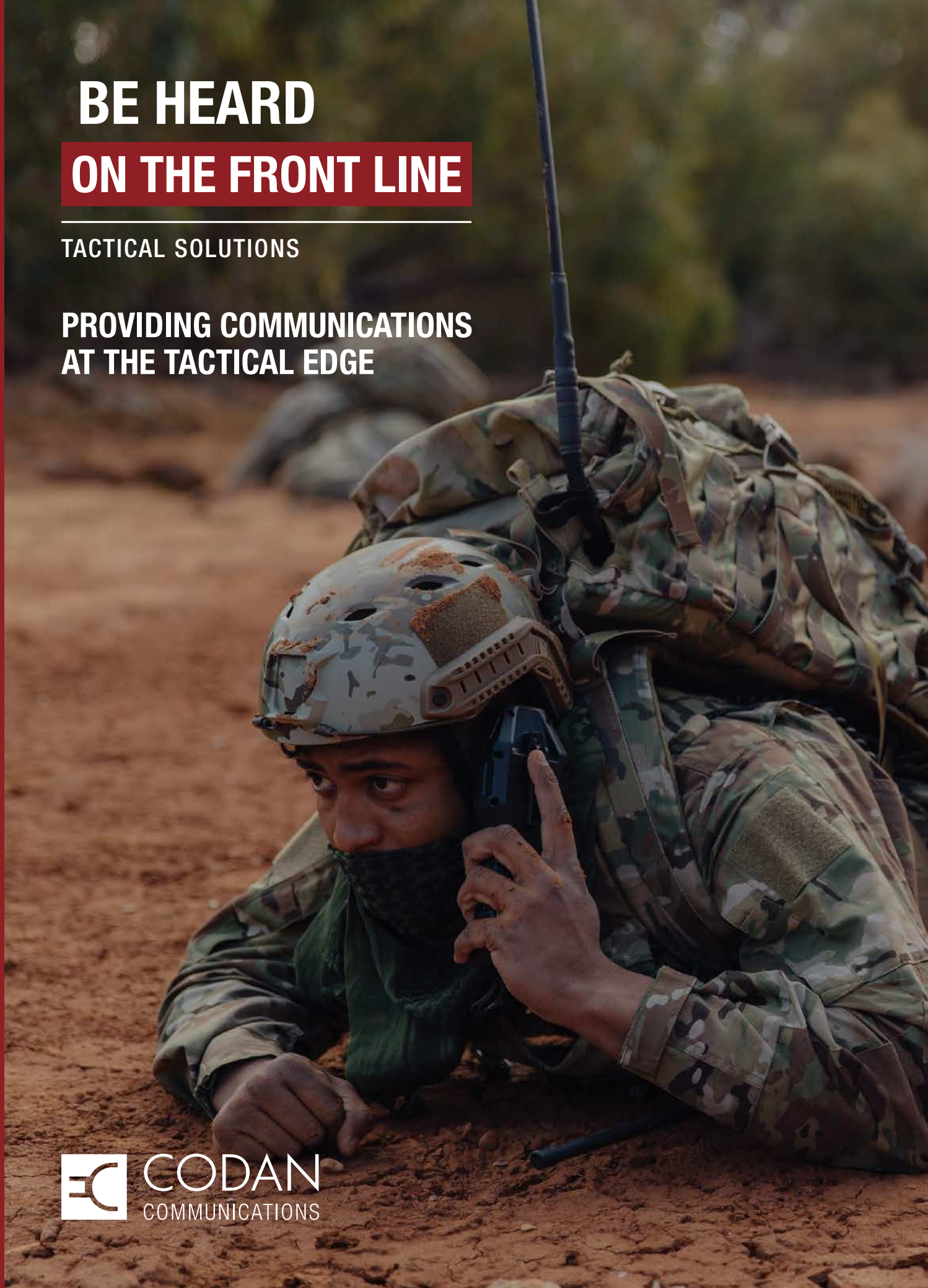


BE HEARD
ON THE FRONT LINE

TACTICAL SOLUTIONS

PROVIDING COMMUNICATIONS AT THE TACTICAL EDGE

CODAN
COMMUNICATIONS

ABOVE Codan RIOS and Sentry-H 6110-MP

THE MILITARY NERVE SYSTEM

Communications are the backbone of military operations and the glue that binds a military force together to conduct successful missions. An effective communication architecture using reliable and appropriate equipment will support the full range of command and control activities, enabling the quick distribution of orders for future operations and the passage of intelligence and surveillance reports. This same architecture is key to effective and accurate fire support, logistic resupply, and casualty evacuation, all of which have a crucial impact on achieving a successful mission.

And in an era where multinational coalition operations are the norm rather than the exception, good communications reduce the risk of misunderstanding and battlefield "fratricide" and are key to supporting counter-insurgency, cross-border and multi-agency operations, when all involved need confirmation of the situation.

Military communications equipment is subject to demanding physical and user requirements over and above its technical demands. It must be sufficiently robust to withstand the rough handling of the battlefield as well as surviving in extreme environments including jungle, desert and arctic conditions. The equipment must meet the demands of its user: if it has to be carried it should be as light as possible; it should be simple to use so the user is not faced with complicated procedures; and fielding the equipment should require the minimum amount of training for quick and simple deployment.

Codan has worked extensively with its customers worldwide to identify their needs and ensure that its solutions meet those needs without additional, costly and over-engineered utilities and features which are under or never utilised. Codan's focus is on giving customers only the feature set they need, avoiding a "one size fits all" mind-set, offering solutions that, while principally focused at the tactical level, encompass requirements at all levels of command and meet operational and strategic needs as well.

CODAN'S HERITAGE

Historically, Codan Communications has provided rugged High Frequency (HF) radios to meet a requirement for beyond line of sight (BLOS) communications and continues to provide the same service to more than 100 countries with particular emphasis on Africa, the Middle East, Central Asia and Asia-Pacifia. Codan has, to date, fielded over 250,000 radio units worldwide.

Codan continuously refines its offering to meet the requirement of the end user. In these days of limited budgets and scrutiny of expenditure, military communications equipment must always offer value for money, providing the right balance between cost, reliability and technological capability. Fiscally challenged end users should have available affordable radios that meet their requirements, particularly those security forces which plan to engage in operations in the most technologically advanced environments.

Even those end users that are receiving external funding need a value for money solution to meet their needs. Often these security forces do not need products built around Type 1 communications security (COMSEC) encryption devices, but rather equipment with the ability to host external encryption when needed. This will give them the ability still to participate in those high-level coalition operations which require secure communications of this nature. These non-NATO military forces need military communications equipment which meets their requirements and is affordable.

The affordable solutions that Codan Communications provides to its customers are carefully designed to ensure that they provide a complete, end-to-end communications package that will connect users and headquarters at every level throughout the command chain, and in every format needed to provide effective command and control. These scalable, flexible solutions combine the sophisticated technology needed for modern military operations, the robustness to ensure survivability in combat conditions, and the interoperability necessary for multifaceted operations with forces from different countries and agencies.

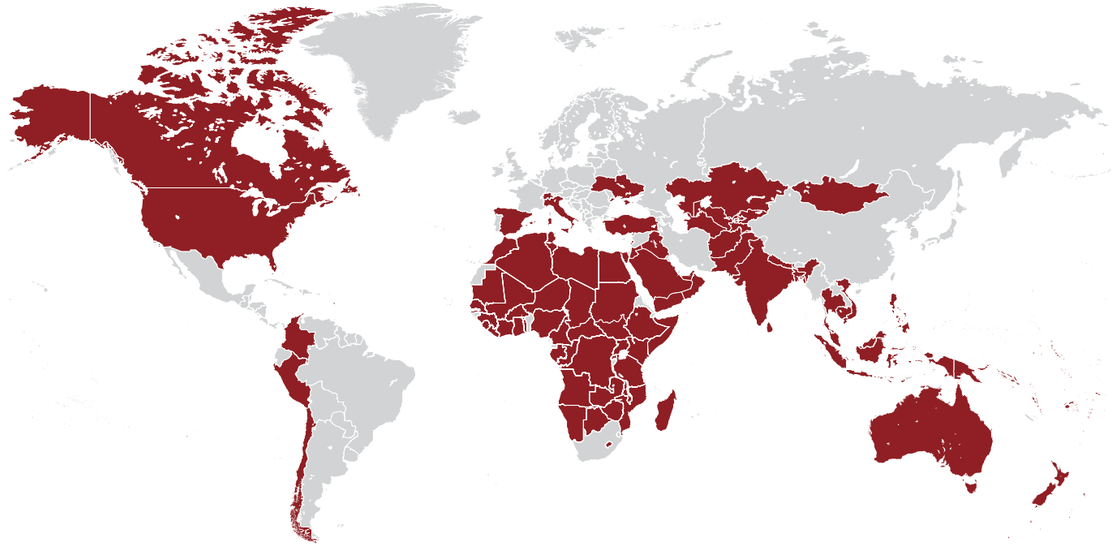
Codan is headquartered in Adelaide, Australia and has manufacturing facilities in Australia, Malaysia and in the United States. The US facility enables Codan to increase its involvement in US-funded military programmes, such as those funded under US Foreign Military Sales (FMS).

"Codan's ability to support partner forces is second to none because of the reliability, sustainability and ease of use of its products"

Lieutenant General Charles Cleveland, US Army retired, Commander US Army Special Operations Command 2012-2015

LEFT Codan headquarters and manufacturing facility in Adelaide, Australia

CODAN COMMUNICATIONS FOOTPRINT



THE FUTURE MANPACK: SENTRY-H 6110-MP

- Software Defined IP Based Radio
- Powerful, lightweight, extended battery life
- Secure Digital Capability Set
- Mission Customisable
- Global Service and Support

Building on its successful HF Software Defined Radio (SDR) products, Codan Communications has now developed its latest SDR manpack, the Sentry-H 6110-MP, one of the smallest and lightest tactical manpacks on the military market, which incorporates all the key features of its predecessors while adding further improvements and refinements. It complements Codan's other SDR products to address specifically the tactical defence market.

The Sentry-H 6110-MP shares the same SDR platform as the successful Sentry-H 6120-BM and is thus based on a proven capability already widely in use. It has evolved through extensive market research and consultations with both existing and potential customers. This included the consideration and evaluation of feedback on 26 data points, all of which have contributed to the current design.

"The Sentry-H 6110 Software Defined Manpack provides the latest technology allowing for ease of use, affordability and quicker upgrades ensuring our customers have the flexibility required in today's challenging environments"

Paul Sangster, Executive General Manager, Codan Communications

Software Defined

As a true SDR incorporating field programmable gate array (FPGA) technology all the functionality in the 6110-MP is field upgradeable. Future improvements can be easily incorporated with no requirement for the equipment to be returned for hardware alterations. In addition, dormant features are available in the software and can be activated if and when a customer desires to expand the equipment capability simply by issuing a software code. This enables future technology developments to be integrated at little cost and provides a strong protection against being overtaken by those developments – so-called "future-proofing".

Because the 6110-MP is an IP-based radio it can be controlled remotely, offering a number of siting options to suit the tactical or physical situation. The radio can be linked either by Ethernet cable or by a point-to-point link to a remote antenna site to achieve better communications conditions or for tactical reasons. These could include siting the antenna outside or on the roof of a building while operating from inside, or displacing the antenna site from the headquarters site by some distance to reduce the headquarters' electronic vulnerability and the exposure of its location to ECM detection of transmissions. The remote capability also enables the radio to be controlled via a LAN, which combined with Codan's Virtual Control Point (VCP) software offers flexibility of control and allows HF network communications to be managed from workstations within a headquarters via a Windows PC or a tablet.

The 6110-MP can also be controlled using Codan's Xtend software application on a smartphone or tablet. Xtend can be used in all commonly used voice modes and for text-based messages. It has the common icon-based user-interface, providing familiarity and consistency to the user.

Powerful and Lightweight

Considerable effort has gone into optimising the Size, Weight And Power (SWAP) of the 6110-MP, resulting in one of the lightest HF manpack radios designed for tactical operations available to military customers and one which Codan believes to be the best performing radio in its class.

The 6110-MP weighs less than 5kg including the battery, which is a common modular, continuously evolving military BB-2590 with full System Management Bus (SMBus) information.

The radio is robust and compact, built and tested to MIL-STD 810G and its durability exceeds that of the typical MIL-STD manpack.

Secure Digital Capability

The 6110-MP has up to 1000 channels, with 500 programmable contacts and 20 programmable networks. It includes Codan's TWELP technology with a vocoder that offers rates from 2400bps to 300 bps, the latter being a lower rate than most equivalent radios, to provide communication when analogue voice cannot be used. It offers 2G ALE to MIL-STD 181 and 3G ALE to STANAG 4539, as well as Codan's market-leading Voice Message Calling capability.

This new facility allows the transmission of digital voice messages over a channel where neither digital nor analogue voice communication works. The 6110-MP supports a voice message duration of up to 100 seconds at 1200 bps digital voice rate or 50 seconds at 2400 bps. All received and sent voice messages are stored in the transceiver call log and can be replayed or forwarded to other stations at any time. The voice messages can also be optionally encrypted over the air with the AES-256 encryption.

Global satellite navigation with GPS, GLONASS and BeiDou is embedded in the radio. An ECCM capability is provided with variable user-configurable hopping sequences and bandwidth. Both AES-256 and CES-128 encryption is offered, both integrated within the radio. Using a standard H250 handset connection, external devices such as handset, headset, intercom and external encryption devices can be added in addition to the Codan 2230 smart handset. Combined with the Codan exclusive Secure Interoperability feature, programmed per channel, this gives the radio the unique ability to operate with three different COMSEC protocols which may be required for integration with existing or other agency communications.

ABOVE Codan Sentry-H 6110-MP

Customisable and Tactically User Friendly

The new user interface of the 6110-MP has been developed based on the customer research programme and using Google's Material design methodology. The customisable icon-driven menu has been completely redesigned and it has been widely tested with a variety of environments and users to ensure that it is as intuitive as possible and useable even by operators who have little knowledge of technical terminology. It is practical and easy to follow.

A key principle has been to make the interface as easy to use and as familiar as a smartphone interface, in order to impart confidence in operating the radio to those unfamiliar with doing so and to reduce the training requirement. A visually representative icon presents a common reference point, unlike legacy character references which can present challenges to users with limited education or low literacy levels.

Network administrators have the ability to customise the interface for particular user sets, hiding menus and options which users do not require to avoid inadvertent mistakes. They can build customised macros to set up the radio to best utilise the features required by particular users, a further demonstration of Codan's philosophy of getting the most from the product with the minimum of complexity.

The interface is currently available in up to 10 languages with additional options set for the future. The radio faceplate is a simple bolt on design to make the hardware language reconfiguration as simple as possible. This is a unique but simple approach to solving the problem of providing commonality of equipment for multinational and multilingual force deployments.

There are some design features specifically intended to enhance tactical use. The integral speaker allows commanders to conduct remote operational updates and briefings over the air directly to troops on the ground in a single communications effort, reducing the time spent in battle procedure and thus increasing operational tempo. The radio has a discreet mode which enhances sound and light discipline, instantly silencing the integral speaker and the display and keypad luminosity. A new addition is a two-handset configuration, added specifically at the request of customers, which either enables two users to operate the radio at the same time, or allows additional external encrypted devices to be connected.

Global Service and Support

The 6110-MP has a three-year extendable warranty, which has a significant impact in reducing sustainment budgets. It is also ITAR-free, which enables it to be repaired in-country, unlike some products which have to be shipped back to the United States or out of the host country for maintenance. This means that the radios, when necessary, can be repaired by Codan's global network of trained service centre engineers and quickly returned to the front line, or customers can be trained to sustain their radio fleets themselves. However, the Mean Time Between Failures (MTBF) record of Codan's products is so good that experience has shown that the need for service and support is minimal.

CODAN'S TACTICAL PRODUCT RANGE

Sentry-H 6120-BM

Codan's Sentry-H 6120-BM is an IP-capable HF SDR transceiver with a 1.6-30MHz frequency range which can be used either in a Base or Mobile vehicle-mounted configuration. In the latter case its wide ranging DC power (11-36 VDC) allows installation in a varied vehicle fleet without the need for additional power conversion. It has an RF power output of 150W, but for strategic and intercountry installations which require greater ranges or for higher volume data it can be combined with a Codan external rack mounted amplifier to give 500W or 1000W output.

The 6120-BM has up to 1000 channels, with 500 programmable contacts and 20 programmable networks that can be scanned simultaneously. It provides Codan's second-generation exceptionally clear secure digital voice, based on a Tri-Wave Excited Linear Prediction (TWELP) vocoder mode, which dramatically improves communications coverage over earlier technology solutions. Security is provided through support for AES-256 and CES 128 encryption and there is a frequency hopping ECCM capability.

The 6120-BM integral 3G Automatic Link Establishment (ALE) technology for fast linking and secure data messaging in accordance with STANAG 4539. A major advantage of ALE is that it synchronously selects the best frequency available for a radio operator initiating a call, thus alerting the operators on both ends to facilitate immediate communications. Concurrently, ALE automatically scans predefined channels and chooses the best channel available which eases the burden on the radio operator and the network as a whole. In the 6120-BM this is enhanced by Codan's ALE Call Rapid technology to keep Link Quality Analysis (LQA) information relevant and reference able.

The radio can be controlled from the Sentry 2320 smart handset which has a colour, high-resolution, icon-based, multi-language interface as well as an embedded loudspeaker. The handset also has an embedded global satellite navigation receiver and antenna which is compatible with GPS, GLONASS and BeiDou.

The 6120-BM has achieved certification from the US Department of Defense (DoD) Joint Interoperability Test Command (JITC). The JITC verifies product interoperability for all products used in DoD networks and this certification confirms that the 6120-BM is qualified as meeting the ALE requirements of MIL-STD-188-141B: Performance and Interoperability Standards for Medium and High Frequency (HF) Radio devices.

The JITC certification establishes a common waveform for ALE operations, a crucial development to support multinational, coalition, and partnership Peacekeeping operations. This certification also guarantees interoperability between Codan and other compliant HF radio suppliers.

"The 6120-BM clearly meets interoperability criteria with other HF radios according to the DoD standard. The JITC certification demonstrates Codan's continued investment in defence applications to support interoperability among militaries operating in unique and challenging environments"

Gene McConville, Vice President for Business Development and Government Relations, Codan Communications

Patrol 2110M

Codan's 2110M manpack HF transceiver has a lightweight, compact and rugged design, is constructed from lightweight alloys and high-impact plastics and can be immersed up to a depth of one metre. It weighs 2.9kg without the battery which provides up to 65hrs of operation. It can also be installed in base station and vehicle mountings, both which have quick release mechanisms for "grab and go".

It operates in the 1.6-30MHz frequency range and has a 25W Peak Envelope Power (PEP) output. It has 600 channels, with 100 programmable contacts and 20 programmable networks, employs frequency hopping for ECCM and offers AES-256 encryption. It uses the same 3G ALE technology and TWELP-based digital voice as the 6120-BM.

The 2110M can be used with the user-friendly 2120 handset as well as a standard H-250 handset.

RIOS

Codan's Radio InterOperability System (RIOS) provides interoperability between a range of communications devices and signalling platforms, including HF, VHF and UHF radios, satellite phones, cellular phones and IP devices. It is frequency and equipment manufacturer agnostic. It can enable a fully integrated communications network from anywhere in the world, can operate as a stand-alone solution without the need for an external internet connection or can provide a remote or multisite solution with a Wide Area Network (WAN) connection.

RIOS has eight high-density interface ports which provide an audio bridge, allowing the rapid interconnection of disparate devices by means of the intuitive Graphical User Interface. Network options include a Local Area Network (LAN) with Wi-Fi and/or customer-provided USB data connection.

Weighing 9.5kg, the Codan RIOS is supplied in a rugged transit case but can also be rack mounted for a fixed site headquarters system with eight ports.

Antennas

Codan provides a range of antenna solutions for maximum durability, mobility and quick deployment for long- and short-range communications. These include whip and field-expedient wire antennas for manpack radios and the new 9300 series vehicle-mounted automatic tuning whip antenna.

This is designed for use with frequency hopping Sentry-H series radios in mobile operations, where transceivers have a large channel capacity. The 9350 typically takes only a few seconds to tune to any frequency and it will automatically seek the optimum tuning point for all operating conditions using its memory tune capability, making it simple to use.

There is also a Near Vertical Incidence Skywave (NVIS) adaptor kit for the 9350, which improves performance of transmit and receive paths over the 0-500km range.

LEFT Codan Communications lightweight and reliable radios are well suited to dismounted tactical operations

BELOW Codan's lightweight manpack HF radios support all aspects of command and control when on the move

TACTICAL TRACK RECORD

Codan has established a strong position in the military and para-military market with its current range of tactical products. Codan's successful communications projects include:

• **Afghanistan Government Agency Communication Network**. This contract involved the provision of HF radio equipment to support an Afghanistan government agency's countrywide secure interoperable communications platform for voice and data transmissions in an area of austere terrain and lacking infrastructure. The multi-year project requirement procured over 8,000 Codan NGT SRx Base/Mobile and 2110 Manpack HF radio systems and services to support secure HF voice and data communications for the agency. The Codan HF radio solutions supplied the agency with a common communications platform, enabling them to coordinate operations between remote border locations and the agency Headquarters as well as supporting communications with other government organisations. Codan systems provided the agency with a self-contained HF network solution which delivered the BLOS communications demanded by the country's austere terrain.

• **Central Asian Inter Agency Communications Network**. This contract provided ten federal agencies within a central Asian country with an interoperable communications platform that supports voice and data transmissions. The multi-year project procured Codan NGT SRx Base/Mobile HF radio systems and services that are capable of transmitting voice, email and pictures for report dissemination. Codan supplied the agencies with a common communications platform to enable them to coordinate among their respective peers from other organisations as well as communicate with their own higher headquarters while conducting joint operations. The project also included the development of multi-language versions of the radio to support the customer's specific requirement.

LEFT The Codan Sentry-H 6110-MP includes a twin-handset facility

• **Central Asian Border Service**. Codan was chosen to equip the Border Service of another central Asian country with a robust, tactical and dependable Information Sharing Communication System (ISCS) for them to perform their mission of protecting their country's borders. Codan delivered NGT SRx Base/Mobile HF radio systems and 2110 Manpack Systems. The ISCS serves as the foundation of all voice and data communications for the Border Service of the country, providing local communication at each Border Service facility, communication services between Border Service facilities, and long distance communication services from lower echelon Border Service facilities to the Border Service Headquarters. The project included the successful installation of the system and the delivery of an in-country training programme and continuing service support.

• **Bangladesh Army**. In 2018 the Bangladesh Army purchased 200 Codan Patrol 2110 manpack HF radios for use in post-disaster recovery operations and to support the Bangladesh Army's UN peacekeeping missions in Africa.

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