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2022/23

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Key Specifications	
Frequency Range	Operating Bands: NIGHTHAWK:.....225—450 MHz RAVEN: .....1250—2600 MHz Bypass:...Outside Operating Band
Output Power	20 W minimum
Input Power	100 mW to 5 W (Configurable)
T/R Switching Speed	Non-Freq Hop..... 2 µs max Freq Hop..... 10 µs max
Size	5.0" W x 3.0" H x 6.0" L (not including connectors)

Fully Automatic Operation

- Fast Auto-Detect T/R Switching
- Harmonic Suppression

Minimum Form Factor

- Suitable for Vehicle, Dismounted & Mobile applications
- IP67 Rated

Key Features:

- NVG Compatible Screen Interface
- Radio and Waveform Agnostic
  - AM, FM. Narrowband, Wideband, MANET
- Fixed Gain, Linear
- Protections:
  - Input Overdrive
  - Antenna Mismatch
  - Over Temperature

Future Features:

- Tethered Operation for Remote Monitor & Control
- Customizable default settings
- Configurable Gain
- Configurable Maximum Level Control (MLC)
- Configurable Automatic Level Control (ALC)
- Fan Kit

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THE DIGITAL ISSUE OF THE ANNUAL ARMADA

RADIO SUPPLEMENT 2022

US Army

Ukrainian national guard soldiers get hands-on training on the Harris 7800v radio systems in May, 2015, provided by paratroopers from the 173rd Airborne Brigade.

MAKING WAVES

Russia's invasion of Ukraine in February could have a profound impact on the tactical communications domain.

by Thomas Withington

What the world is seeing in Ukraine is a semblance of a peer-on-peer conflict. Granted, Ukraine is not a member of the North Atlantic Treaty Organisation (NATO). She remains reliant on Soviet-era and Russian materiel supplied before relations deteriorated in the wake of Russia's first invasion of the Crimea in 2014. However, prior to the latest invasion, Ukraine began receiving advanced communications equipment. These supplies increased in size and scope following Russia's invasion on 24 February. Most media attention has focused on supplies of kinetic weaponry. Lockheed Martin's M-142 High Mobility Artillery Rocket System, better known as HIMARS, has emerged as a star of the conflict. Likewise, the Raytheon/Lockheed Martin FGM-148 Javelin anti-tank guided missiles is engaging Russian armour.

Less discussed are supplies of Western communications equipment, and the effect these maybe having on the fortunes of the Ukrainian armed forces. Following the 2014 invasion, the United States began supplying L3Harris RF-7800V Single Channel Ground and Airborne Radio System transceivers to Ukraine. Better known as SINCGARS, these radios are now considered somewhat legacy systems by NATO members. Debuting in the 1990s, SINCGARS radios are still widely used across NATO. In fact, alliance members like the US are ensuring their new transceivers are compatible with the SINGARS waveform. For Ukraine SINCGARS has emerged, albeit quietly, as another star of the war. Armada has been told by sources in the Ukrainian theatre of operations that the SINCGARS waveform has resisted jamming by Russian Army Electronic Warfare (EW) systems.

SINCGARS' impressive resilience has not been lost on the US armed forces. In 2017 the US Army's Programme Executive Office for Command and Control embarked upon a SINCGARS upgrade. Among other adornments, this is rolling out AES-256 standard encryption into the force's SINCGARS radios. AES-256, of which the United States' National Security Agency is the custodian, is used for the carriage of US Top Secret traffic. Open sources say that AES-256 encryption is considered unbreakable by today's available computing power.

SHORTCOMINGS

While the war in Ukraine has showcased the enviable vigour of SINCGARS, it has also highlighted glaring deficiencies. Nowhere has this been arguably more visible than in the current condition of Russian Army tactical communications. The early stages of the war illustrated what seemed to be a series of Russian communications failings. Army voice traffic was heard on clear high frequency (three to 30 megahertz) channels, eavesdropped upon by radio amateurs in and around the theatre of operations. Traffic often betrayed tales of woe suffered by Russian troops and their commanders as the war gathered pace.

The situation has seemed little better at the tactical edge. The conflict was still relatively young when pictures began cropping up on social media of Russian infantry relying on cheap Chinese civilian handheld 'walkie-talkie' style radios. These radios are very easy to intercept and are highly susceptible to jamming. Further revelations followed in August. A report by the London-based Royal United Services Institute thinktank entitled Silicon Lifelines exposed the quantities of Western and third-party electronics in Russian radios. Some of these components were legitimately acquired by Russia before sanctions started to bite following the 2014 invasion. Other components are not subject to export restrictions. some may have been acquired nefariously through false pretences by Russia's intelligence services. Furthermore, intermediary countries may have supplied uncontrolled and controlled components to Russia's electronics industry. Some suppliers in Hong Kong were highlighted in the report as acting in this fashion.

The report raises many questions. Why are Russian manufacturers not building these components themselves? Do they not have the wherewithal to do so economically at the volumes required by defence electronics manufacturers? Is it simply easier and more economical for Russia's defence industry to acquire third party electronics even if done so illegally? Have Russian manufacturers stockpiled third party components for use in their defence electronics. If so, how long might these stockpiles last?

L3Harris

L3Harris supplied its RF-7800V radios to the Ukrainian armed forces in the wake of Russia's 2014 invasion of the country. The SINCGARS waveform used by these radios have proven resilient against Russian jamming.

CONSEQUENCES

The lessons of Ukraine's bitter war will be digested in staff colleges, procurement brain-stormings and policy focus groups for years to come. What are the potential effects on the tactical communications landscape beyond the Ukrainian? A caveat should be added that we are but part way through what is likely to be a long conflict. Nonetheless some initial observations can be made.

Perhaps almost too obvious to state, but the centrality of robust, encrypted communications is central. The extent to which SINCGARS has acquitted itself is nothing short of breath-taking. That a waveform fielded over three decades ago remains strong against the best that the Russian Army's EW units can throw at it is impressive. If Ukraine's tenacious enemy cannot break this 'hipster' waveform, how will it fair against state-of-the-art waveforms the US and her allies will field in current and forthcoming radios? Hopefully, the experience of SINCGARS in Ukraine augers well for initiatives like TrellisWare's TSM networking waveform. For all intents and purposes, TSM will superseded SINCGARS in the coming years. TSM can carry both US Sensitive but Unclassified and Secret and Below traffic, the latter using NSA Type-1 encryption. TSM will primarily be fielded at the company level and below. Provided there are no major advances in the acumen of Russian electronic warriors, tomorrow's waveforms should be resilient if the experience of SINCGARS is a guide. Nonetheless, this is no excuse for complacency. Just because Russian Army EW has struggled against a legacy waveform, it does not mean US and allied militaries should be complacent about communications robustness. This should encourage tactical communications engineers to push the outside of the envelope yet further to ensure their hardware and software is simply beyond the nefarious reach of potential enemies.

Another lesson concerns internal and external interoperability. It seems that large numbers of Russian Army radios cannot work with each other. The army was in the middle of a major overhaul of its tactical communications when the war in Ukraine expanded in February. It was thus in an unhappy place. The majority of its manoeuvre units were using legacy, and probably obsolete, transceivers. Elite airborne

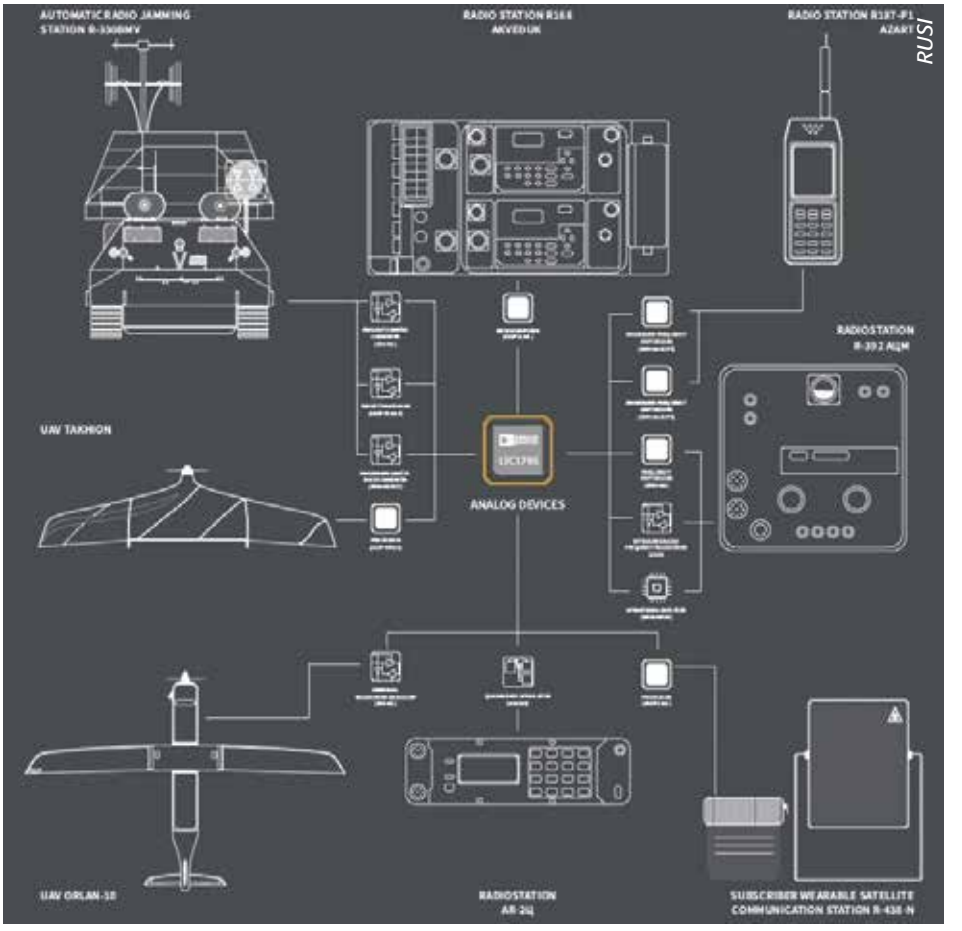
One of the early revelations of the Ukraine war was the extent to which Russian dismounted infantry rely on civilian standard communications like these Baofeng 'walkie-talkie' style radios.

and naval infantry units had received the newer kit. This should not in itself have been a problem provided both legacy and new radios share common, robust waveforms allowing them to communicate with one another. The reality on the ground seems quite the opposite and this has hampered Russian Army command and control.

Ironically, NATO and allied nations find themselves in a similar position to their Russian rival. France, Germany, the United States and the United Kingdom are all modernising their land forces tactical communications. By necessity, this will see legacy radios being phased out as new ones are introduced. This means that disparate systems will have to work alongside each other. Are these, and other nations, confident their armies can use new and old radios on the battlefield seamlessly and securely? If they are not, they should be remedying this situation with alacrity.

Interoperability extends beyond individual armies. If the unthinkable happens and NATO's armies are forced to fight Russia, can they do so in a coordinated manner? Coordination is contingent on robust, flexible communications allowing NATO's manoeuvre forces to talk and share data with one another. The ESSOR (European Software Defined Radio) waveform provides a common high-data rate, radio agnostic waveform. ESSOR is equipping the armies of Finland, France, Germany, Italy, Spain, Poland and Portugal. The waveform will enter service in the coming years allowing traffic to be moved between manoeuvre forces. NATO's Coalition Wideband Networking Waveform (COALWNW) was to have performed a similar role. However, COALWNW now appears moribund, if not stillborn. Worryingly, the alliance does not appear to have anything to replace it. Going to war without a multilateral wideband waveform designed for coalition networking should be an unthinkable prospect. Should NATO look towards adopting ESSOR or something similar? Brussels can no longer postpone this decision and must take action now before the strategic environment worsens.

The final lesson relates to budgets and programmes. The digestion of the lessons from Ukraine will crystalise into demands for new materiel and upgrades of existing systems. Funds for these acquisitions cannot be appropriated at the expense of military communications programmes. Tactical radios lack the glamour of main battle tanks, uninhabited aerial vehicles and self-propelled artillery, for example. Voters and politicians alike may balk at the significant costs of tools that simply allow soldiers to talk to each other and share information. The Russian Army's experience shows that bad communications translate into bad situational awareness. This leads to bad coordination and ultimately bad decisions. It is incumbent on policymakers and personnel to stay the course and ensure their communications are not paired back to pay for heavy metal as both are essential. A



Recent research from the Royal United Services Institute has highlighted the dependence of Russian defence electronics manufacturers on Western and third-party supplied components, as shown in this diagram from RUSI's Silicon Lifeline report.

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TEST SOLUTIONS

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PR9560 — AT Electronic and Communication International

Power: 0.5/2/4W
Frequencies/waveforms: 30MHz to 87.975MHz. Combat Net Radio (CNR), Voice Relay Network (VRN) and Packet Radio Network (PRN) waveforms
Security: AES 256/Customised COMSEC and ECCM
Weight: ≤ 0.6kg (with 3800mAh battery)
Notes: PR9560 is intended for land forces such as infantry, forward observers, snipers, special forces and anti-terrorist units, and can be deployed at the platoon or company level. CNR's primary role is voice or data transmission in battlefield via point to point/ point to multi-points communication. VRN extends voice communication distance by chaining. PRN mainly serves as data transmission for man to machine and machine to machine in battlefield.

PRR 1M — AT Electronic and Communication International

Power: 100mW EIRP max
Frequencies/waveforms: 2.4GHz, spread spectrum, 240 operating channels, eight selectable nets
Security: Time hopping, frequency hopping and OFDM resists interception, jamming.
Weight: 1kg
Notes: PRR designed for operation within groups of up to 30 users allows for full duplex communication in ad-hoc digital networks, needs no additional infrastructure. Can link to another network through transceiver connected via USB.

PRC-2090 HF manpack transceiver — Barrett Communications

Power: 30W/10W PEP (Selectable) output power
Frequencies/waveforms: 1.6MHz to 30MHz/ Modes: J3E (USB, LSB), H3E (AM), J2A (CW), J2B (AFSK) modes. Digital Voice: 600/700, 1200, 2400Bps (MELP/TWELP)
Security: Encryption standards: AES256 & DES56. Frequency Hopping: 5 or 25 hops per second
Weight: 3.90kg (5.2kg with Barrett high performance Li-ion Battery with built in charge controller)
Notes: 2G and 3G ALE options MIL110, 3G (STANAG) & CLOVER data options. PRC-2091 is a 12.85kg tactical mobile transceiver with a vehicle docking station and extra power (125W setting). PRC-2092 is a 14.3kg tactical base station with extra power (125W setting) and a mains power supply.

PRC-2080+ Tactical VHF radio — Barrett Communications

Power: 5W hand portable, 25W manpack, 50W mobile, base station & rebroadcast
Frequencies/waveforms: 30MHz to 88MHz, 25kHz channel resolution, 10 channels
Security: Multiple levels of encryption and frequency hopping security available: Analogue Voice - Fixed Frequency, Digital Unencrypted Data - Fixed Frequency, Digital Encrypted Voice - Fixed Frequency (DEFF), Digital Encrypted Voice - Frequency Hopping (DEFH), Digital Encrypted Voice - Free Channel Search (DEFCS), Digital Encrypted Data - Fixed Frequency, Digital Encrypted Data - Frequency Hopping
Weight: 1.3kg with battery pack
Notes: Military grade portable communication transceiver specifically designed for tactical applications. It is designed to meet complete immersion, vibration, drop to MIL-STD 810G. Available in both handheld and man-pack forms.

PRC-2081+ – 25 W VHF Manpack — Barrett Communications

Power: 25W
Frequencies/waveforms: 30MHz to 88MHz, 25kHz channel resolution,10 channels
Security: Multiple levels of encryption and frequency hopping security available: Analogue Voice - Fixed Frequency, Digital Unencrypted Data - Fixed Frequency, Digital Encrypted Voice - Fixed Frequency (DEFF), Digital Encrypted Voice - Frequency Hopping (DEFH), Digital Encrypted Voice - Free Channel Search (DEFCS), Digital Encrypted Data - Fixed Frequency, Digital Encrypted Data - Frequency Hopping
Weight: 7.7kg with backpack frame and 16.8V 10 Ah Li-Ion battery pack
Notes: PRC-2081+ 25 Watt Man-pack upgrades the PRC-2080+ transceiver with increased power and communication range. Standard package includes: man-pack dock, battery pack, AC/DC charger, collapsible section whip, tape whip antenna, handset, framed backpack.

PRC-4090 HF Tactical Manpack Transceiver — Barrett Communications

Power: Tx 30W/10W PEP (Selectable), Rx current consumption 250mA
Frequencies/waveforms: 1.6MHz to 30MHz/ Modes: J3E (USB, LSB), H3E (AM), J2A (CW), CF (Custom Filter) ISB (Data) modes. Digital Voice: 600/700, 1200, 2400 Bps (MELP/TWELP)
Security: Encryption Standards: AES256 & DES56. Frequency Hopping: 5 or 25 hops per second
Weight: 2.95kg (4.55kg with BB2590 Battery / 5.00kg with Barrett high performance Li-ion Battery with built in charge controller)
Notes: 2G and 3G ALE options, MIL110, 3G (STANAG) & CLOVER data options. Released September 2019. PRC-4091 is a 9.35kg vehicle mobile version with extra power (additional 125W & 150W settings) and a docking station with anti-vibration mounting. PRC-4092 is an 11.15kg base station with extra power (additional 125W & 150W settings) and a docking station and AC mains power supply.

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BLD100 Tactical Radio — Benelec

Power: 1W to 3W
Frequencies/waveforms: VHF 30MHz to 88MHz, full civilian CTSS squelch, standard military 150Hz sub-audio tone
Security: external encryption modules
Weight: 0.295kg including battery & antenna
Notes: Designed for platoon communications, BLD100 is a fixed frequency handheld radio family in IP67 housing, complies with Mil Std 810C, D, E & F. Features built-in data modem.

BL350U UHF FM tactical radio — Benelec

Power: 2W to 4W selectable
Frequencies/waveforms: 380MHz to 420 MHz, up to 128 channels with 12.5Hz or 25Hz spacing
Security: AES 256bit encryption optional
Weight: 0.285kg including 1700mAH Li-ion battery
Notes: Up to 14 hour battery life, IP54 water & dust protection, priority channel & talkback scanning, 1,200/2,400 baud modem, programming via USB, voice operated transmission (VOX).

Tough SDR Handheld — Bittium

Power: 5W (PEP)
Frequencies/waveforms: 30MHz to 2500MHz/ Bittium Narrowband Waveform, Bittium TAC WIN Waveform with data throughput up to 25Mbps, ESSOR High Data Rate Waveform, supports porting of legacy and national waveforms
Security: Red/black separation, secured boot, tampering detection & response, emergency erase, COMSEC and TRANSEC allowing implementation of national algorithms, Application Sandbox for customer applications
Weight: 950g with battery
Notes: SDR-based tactical handheld radio for individual soldiers, such as squad or platoon leader, providing a uniquely wide frequency range. With flexible configuration options and routing networks, supporting 'thousands' of radios in one network. Built-in GNSS, camera, transflective TFT LCD (320 x 426) display

Tough SDR Vehicular — Bittium

Power: 12V DC to 32V DC according to MIL-STD-1275E
Frequencies/waveforms: 30MHz to 2.5GHz. Bittium Narrowband Waveform, Bittium TAC WIN Waveform, ESSOR High Data Rate Waveform. Supports porting of legacy and national proprietary waveforms.
Security: Red/Black separation, secured boot, tampering detection and response, emergency erase, COMSEC and TRANSEC allowing implementation of national algorithms, application sandbox for customer applications.
Weight: 15kg
Notes: The Tough SDR Vehicular forms part of Bittium's Tough SDR product line which also includes the Tough SDR Handheld radio; both of which are being supplied to the Finnish armed forces.

PRQ-7 Combat Survivor Evader Locator (CSEL) — Boeing

Power: 5W (PEP)
Frequencies/waveforms: VHF, UHF, satcom
Security: TNSA certified encryption and decryption of OTH and LOS messages
Weight: 0.9kg
Notes: When activated by the Isolated Person (IP), 6-channel CSEL handheld automatically transmits the IP's GPS location and identification and enables the IP and rescue centres to exchange messages.

Sentry-H 6110-MP — Codan Communications

Power: 30 W PEP ± 1dB (two-tone or voice), user-programmable in 1W steps (low/medium/high)
Frequencies/waveforms: Transmit: 1.6 to 30 MHz (optional: 1.5 to 30MHz) Receive: 250 kHz to 30 MHz with up to 1,000 channels
Security: AES-256 digital voice and data (256 keys, direct entry and programmable via Codan KMS/KFS & USB memory stick), CES-128 voice (97x16-digit keys, direct entry and programmable via Codan KMS/KFS & USB memory stick, 4-digit session PIN)
Weight: Radio without battery box: 2.45 kg, Radio with regular battery box (without battery): 3.23 kg, Radio with short battery box (without battery): 3.08 kg, Radio with regular battery box and 17.4Ah battery: 4.65 kg, Radio with short battery box and 8.7Ah battery: 3.95 kg
Notes: Codan's Sentry-H 6110-MP delivers a rugged man-portable Software Defined Radio (SDR) solution for military organisations that demand uncompromised, secure voice and data communications, while on the move. The 6110-MP forms an integral part of the Sentry-H product family that meets the demands of the modern battlefield whilst offering full backwards compatibility with legacy products. The 6110-MP is one of the smallest, lightest form factor manpack HF radios available, delivering a powerful 30W RF power in a unit weighing less than 4 kg without compromise on any capabilities.

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Sentry-H 6120-BM — Codan Communications

Power: 150 W PEP ±1 dB (two-tone or voice), user-programmable in 1 W steps (low/medium/high)
Frequencies/waveforms: Transmit: 1.6 to 30 MHz (optional: 1.5 to 30MHz) Receive: 250 kHz to 30 MHz with up to 1,000 channels
Security: AES-256 digital voice and data (256 keys, direct entry and programmable via Codan KMS/KFS & USB memory stick), CES-128 voice (97x16-digit keys, direct entry and programmable via Codan KMS/KFS & USB memory stick, 4-digit session PIN)
Weight: RFU: 2.82 kg; Handset: 280 g (no cable)
Notes: Codan's Sentry-H 6120-BM delivers a rugged Software Defined Radio (SDR) solution for military organisations that demand uncompromised, secure long range voice and data communications. With 150W RF power, it has been specifically designed to deliver the smallest and lightest form factor for no-fuss integration into base and mobile platforms.
In close consultation with military customers, the 6120-BM has been optimised for ease-of-use and features an ergonomic smart handset with a colour, high-resolution multi-language interface and a variety of other capabilities.

SENTRY-M 6170 — Codan Communications

Power: Handheld: 0.1W, 1W, 5W, Base/Mobile: 5W, 20W, 50W
Frequencies/waveforms: Handheld: 20 to 520 MHz, Base/Mobile: 30 to 520 MHz
Security: AES256 (COMSEC), Frequency Hopping (TRANSEC) and NETSEC.
Weight: Handheld: <1 kg (with Battery and Antenna), Vehicle dock: 2 kg, Power amplifier: 9.5 kg
Notes: Codan's Sentry-M 6170-HH is an advanced, secure and easy to operate handheld multiband military Software-Defined Radio (SDR) designed for use in the harshest environments worldwide. With continuous spectrum coverage from 20 MHz through to 520 MHz, the 6170 provides simultaneous voice, data and situational awareness (APP-6 NATO standard for tactical BMS).

PRC7700H manpack — Datron

Power: 100W
Frequencies/waveforms: TX: 1.5MHz to 30 MHz (10Hz steps), RX: 100kHz to 30MHz/ waveforms, modulation types, wide & narrow bands, and communications security can be updated via software
Security: Integrated high-level encryption option with front panel quick-connect key fill port and zeroize button
Notes: IP-addressable, digital, ALE-capable HF manpack SDR combining DSP-IF circuitry and powerful microprocessors, also suitable for mobile, rack-mounting or desktop use. Can be used as a man-pack or vehicle-mounted set. Features an internal GPS receiver with external TNC antenna connector mounted on the front panel.

PRC1099A HF tactical manpack — Datron

Power: 5W to 20W, PEP or average, man-pack; 5/20/100/400W in mobile configuration. Capable of continuous duty service at 5W.
Frequencies/waveforms: 1.6MHz to 30MHz, 10Hz Steps, 100 programmable channels
Security: optional add-on
Weight: 4.4kg plus 2.4kg battery pack
Notes: Rugged (MIL-STD-810), immersible man-pack with internal automatic antenna tuner, remotely controllable and with FED-STD-1045A ALE capability. Can be used as core of high-power vehicle system based on core man-pack, which retains emergency "jerk-and-run" capability.

PRC2100V — Datron

Power: 500mW to 10W (Manpack) & 500mW to 75W (mobile or base station)
Frequencies/waveforms: 30MHz to 88MHz, 100 programmable channels
Security: Embedded ECCM, COMSEC for voice and data. Full- or partial-band frequency hopping, digital encryption, and internal GPS receiver with external TNC antenna connector
Weight: 4.2kg plus 1.8kg battery pack
Notes: Interoperable in all encryption and hopping modes with the HH2100V handheld radio, can be used in a network to provide base station, vehicle, man-pack, or retransmit capabilities.

PRC1077 VHF tactical manpack — Datron

Power: 500mW, 2W and 5W selectable
Frequencies/waveforms: 30MHz to 88MHz in 25kHz steps, 10 programmable channel presets
Security: encryption module, KRC1077, high-security voice scrambler optional
Notes: Interoperable in FM clear-voice mode with Datron Squad Radio family and most other single-channel 30MHz to 88MHz VHF/FM radios using a 150Hz tone-squelch or CTCSS squelch system

TACTICAL RADIOS LISTINGS

HH2100V Spectre-V tactical VHF handheld — Datron

Power: Up to 5W output power in three programmable steps
Frequencies/waveforms: 30MHz to 87.975MHz, 100 programmable channels
Security: Full- or partial-band frequency hopping and digital encryption, 2 COMSEC modes (40bit and 64bit)
Weight: 1.2kg with battery
Notes: Meets MIL-STD-810 for reliable operation in harsh environments, accurate position and time-of-day capability is afforded by the embedded GPS receiver, offers short messaging

HH7700 — Datron

Power: 500mW, 2W and 5W, user selectable
Frequencies/waveforms: 30MHz to 88MHz, 2,320 channels at 25kHz spacing with 15 programmable presets
Security: optional embedded voice scrambler
Notes: compact and lightweight VHF/FM handheld transceiver, offers VOX for hands free operation and whisper mode, interoperable in FM clear-voice mode with Datron Squad Radio family

HH3100 Spectre M multiband tactical transceiver — Datron

Power: up to 7W in three programmable settings
Frequencies/waveforms: 30MHz to 512MHz (depending on model), 100 programmable channels
Security: Embedded ECCM & COMSEC with Spectre 40, 64, and new AES-256, frequency hopping and digital encryption. Fully compatible with PRC2100V and HH2100V SpectreV ECCM
Weight: 1.2kg inc battery
Notes: Spectre M family offer secure communications in ruggedised form-factors, provide a sophisticated feature-set, and utilise a simplified user interface, includes three versions: HH3100V, HH3100A, and HH3100M. Groundto-Air AM operation in some models.

SDR-M — Domo Tactical Communications (DTC)

Power: 400mW (2x2 MiMo)
Frequencies/waveforms: 1.2GHz to 2.5GHz banded
Security: AES256/AES128 bit encryption, Interference Avoidance System
Weight: As low as 26g
Notes: DTC's SDR-M is one of the smallest and lightest full MANET transceivers in existence. Fully compatible with and offering the same waveforms, bandwidths and data rates as its larger companion products, the SDR-M is a minitaurised single board design designed to offer outstanding SWaP. The SDR-M serves as the communications core for multi-role unmanned systems in an array of tactical, military and paramilitary use cases from border surveillance, ISR and unattended sensors to remote weapons platforms and swarming drones. Popular due to its very low power consumption, performance at range and ultra-lightweight physical form factor, the SDR-M can be rapidly delivered in quantities of thousands.

SDR-H2 handheld mesh radio — Domo Tactical Communications (DTC)

Power: 2W (2x2Mimo)
Frequencies/waveforms: 320MHz to 5GHz banded
Security: AES256/AES128 bit encryption, Interference Avoidance System
Weight: 634g
Notes: The SDR-H2 is DTC's enhanced next-generation Special Role Radio designed to meet a diverse range of tactical applications. The SDR-H2 is in service with a diverse range of military, police and public safety agencies worldwide, used for terrestrial, ground to air, air to air and maritime operations. Tested to MIL-STD810H the SDR-H2 was designed for operation in the most demanding of tactical environments.. DTC's new ATAK plug-in allows full network management and control of the radio from within the TAK environment.

NETNode RM/RH mobile/infrastructure mesh radio — Domo Tactical Communications (DTC)

Power: 30W (2x4 MiMo)
Frequencies/waveforms: 320MHz up to 5GHz non-contiguous
Security: AES256/AES128 bit encryption, Interference Avoidance System
Weight: <2.0kg
Notes: The NETNode RM/RH is DTC's mobile and battlefield infrastructure mesh radio. A heavily-optimized form factor makes the NETNode ideal for employment in a range of scenarios including size-restricted vehicle and UGVs. Successfully employed not only in terrestrial battlefield operations but also a wide range of unmanned systems, the NETNode's ability to provide high data rates at long and extremely long ranges even at narrow bandwidths make it the MIMO radio of choice for diverse end users around the world.

TWH-101 and TWH-104 Personal Radios — EID Tactical Radio Systems

Power: 100mW for TWH-101R
Frequencies/waveforms: Operates in the 2.4GHz ISM band with low-probability-of-detection TDMA waveform.
Security: AES encryption, user downloadable keys
Weight: 300g to 680g including batteries.
Notes: Provides full-duplex audio conference, simultaneous data, dual PTT, stereo operation, VOX, whisper mode, voice prompt menus, automatic network management, embedded GNSS

TWH-104G1 and TWH-104G3 Portable Gateways — EID Tactical Radio Systems

Power: 400mW
Frequencies/waveforms: AES encryption
Range: 2km line of sight
Maximum data rate: 115.2kbps
Weight: 0.225kg inc batteries: 9VDC to 33VDC in TWH-104G1, 3VDC from 2x LR6 cells or 2x NiMH LR6 rechargeable batteries.
Notes: Creates a gateway between a TWH network and external equipment such as CNR, legacy radios etc.

Micom 3 Pathfinder manpack — Elbit Systems of America

Power: 25W
Frequencies/waveforms: 1.6MHz to 30MHz HF-SSB, 200 preset channels
Security: Digital AES vocoder encryption, internal modem with optional AES encryption
Weight: 3.6kg without battery
Notes: Provides long-range communications in demanding dismounted operations. Automatic Link Establishment per MIL-STD-188-141B standard.

PNR-500 Personal Network Radio — Elbit Systems

Power: up to 800mW
Frequencies/waveforms: 380MHz to 430MHz or 400MHz to 450MHz UHF, 100kHz channel spacing, 15 presets
Security: AES encryption
Weight: Less than 450g including battery
Notes: Offers SOF, snipers & CT units simultaneous voice and data communication at ranges to 1,500m, long-range links via VIC-500 vehicle intercom or tactical VHF/HF radio.

PNR-1000A Personal Network Radio — Elbit Systems

Power: 0.5W, 1W, 2W adjustable
Frequencies/waveforms: 225MHz to 512MHz,
Security: AES 256 encryption based on FIPS 197 standards
Weight: < 0.36kg
Notes: E-Lynx family SDR for dismounts providing full-duplex voice, data and video, ad hoc networking for 64 members. Self-synchronises without master station or GPS, features embedded GPS position reporting.

CNR-710 Handheld — Elbit Systems

Power: 5W, 20W with amplifier
Frequencies/waveforms: 30MHz to 88MHz VHF/FM, 25kHz channel spacing, 20 presets, software controls programming, network management, data comms etc
Security: Voice and data encryption, advanced frequency-hopping synchronisation. Digital encryption with very long non-linear "white" sequences, clear over-ride and COMSEC alarm
Notes: Handheld member of CNR family. Features synchronous/asynchronous data transmission, error correction coding, automatic data rate adaptation. More powerful manpack, airborne & vehicle configurations available.

CNR-710MB multiband radio — Elbit Systems

Power: 5W handheld & man-pack, 20W high-power man-pack, vehicular & air-borne
Frequencies/waveforms: 30MHz to 512MHz, 25kHz channel spacing, 20 preset channels
Security: Digital COMSEC, orthogonal frequency hopping ECCM
Notes: Multi-band radio providing ground, sea, and air units with wide frequency coverage and waveforms. Dynamic network synchronisation eliminates the need for a central control station. Uses Tadiran's synchronous-orthogonal frequency hopping technology, and is fully compatible with legacy Tadiran frequency hopping systems like the CNR-710, CNR-900, CNR-9000 and CNR-9000HDR.

MTCR-7200 V/UHF man-pack — Elbit Systems

Power: 10W
Frequencies/waveforms: 30MHz to 512MHz narrowband waveform, 225MHz to 512MHz wideband waveform, multiple waveforms covering the aforementioned NATO mobile frequency bands, 100 channels per waveform.
Security: AES256 encryption and Elbit/Tadiran algorithm, synchronous orthogonal frequency hopping, autonomous, GPS-independent synchronisation with master station, no single point of failure.
Weight: <3kg manpack
Notes: Extended networking coverage using robust and unique multi-hop concurrent flooding techniques. Provides simultaneous multiple voice sessions along with data and video services. Embedded IP router supports standard IP routing protocols. Embedded GPS supporting continuous high resolution Blue Force Tracking.

PRC-434G/CS survival radio — Elbit Systems

Power: 1W UHF & 121.5MHz
Frequencies/waveforms: 225MHz to 299.975MHz + 121.5MHz, 3,000 channels in 25kHz steps
Security: Encrypted individual identification code assigned to each user; LPI/LPD
Weight: less than 0.85kg
Notes: ASARS- and NATO-compatible radio featuring automatic activation, transmission of GPS location data and digital emergency messages, can be activated by another PRC-434. Endurance of 30 hours at 1:10 Tx/Rx ratio.

Hook 3 combat survival radio — General Dynamics Mission Systems

Power: 1W – UHF; capable of 5W (FM), 200mW – VHF; capable of 2W (FM), 406 SARSAT 5.0W min, UHF SATCOM 5.0W ± 2dB
Frequencies/waveforms: 121.5MHz, 123.1MHz; 225MHz to 320MHz; capable of 100MHz to 512MHz; 406 SARSAT, Hook 2 & satcom
Security: Hook 2 waveform is secure, 256bit AES encryption for satcom
Weight: 0.680kg
Notes: New Hook family CSAR radio that is smaller, lighter and more power-efficient than its predecessors. Fully compatible with existing Hook 2 radios, Quickdraw2 interrogator, satcom base station.

AN/PRC-112G Transceiver — General Dynamics Mission Systems

Power: Selectable up to 5W
Frequencies/waveforms: 225MHz to 450MHz, 1250MHz to 1390MHz, 1755MHz to 1850MHz, SRW and future waveforms
Security: Programmable COMSEC and TRANSEC, Type 1, Type 2, not a Controlled Cryptogrphic Item (non-CCI)
Weight: 0.767kg with battery, 0.43kg without
Notes: Small handheld networking radio providing secret or sensitive-but-unclassified communication for leaders or squad members in a single non-CCI device, designed to operate with AN/PRC-155. Compatible with Sidewinder vehicle mount.

AN/PRC-154A Rifleman Radio — General Dynamics Mission Systems

Power: Selectable up to 5W
Frequencies/waveforms: 225MHz to 450MHz, 1250MHz to 1390MHz, 1755MHz to 1850MHz, SRW and future waveforms
Security: Programmable COMSEC and TRANSEC, Type 1, Type 2, not a Controlled Cryptogrphic Item (non-CCI)
Weight: 0.767kg with battery, 0.43kg without
Notes: Small handheld networking radio providing secret or sensitive-but-unclassified communication for leaders or squad members in a single non-CCI device, designed to operate with AN/PRC-155. Compatible with Sidewinder vehicle mount.

Pro & Pro X goTenna — goTenna

Power: up to 5W
Frequencies/waveforms: 142MHz to 175MHz VHF, 445MHz to 480 MHz UHF channel spacing 6.25kHz, 12.5kHz, 25kHz (user selectable), 4GFSK modulation
Security: end-to-end PKI encryption (256-bit AES)
Weight: 78g
Notes: Small, light digital mesh-networking tactical radio designed to work with an iOS and Android smartphone apps. Designed to enable 100 percent off-grid comms using Android Team Awareness Kit, also supports custom apps. Offers text messaging, GPS team tracking, collaborative mapping, point sharing of targets, friendlies, rally points, medevac locations etc, emergency beacon. Pro X radios transmit critical data up to four miles point-to-point, and securely hop messages across six devices. Both offered with multi-device deployment kits.

SR600 UHF Soldier Radio — Kongsberg Defence Systems

Power: 10mW to 1W
Frequencies/waveforms: 225MHz to 400MHz, to 5MHz bandwidth
Security: Embedded AES256 encryption
Weight: 0.7kg
Notes: Software-defined, IP-based SR600 connects all soldiers within a squad while offering full integration into the platoon/company network. Allows the squad leader full intra- and inter squad radio communication with a single radio. Also features high data capacity to share video over realistic combat distances.

MH300 Handheld Multi-Role Radio (MRR) — Kongsberg Defence Systems

Power: 15mW, 1W
Frequencies/waveforms: 30MHz to 87.975MHz, 2,320 channels
Security: Built in encryption, up to level secret, comprehensive crypto and key management provided
Weight: 1.055kg
Notes: Software configurable handheld MRR suited to CNR voice and advanced data networks. Features include tactical SMS with free-text or predefined messages (individual or group), "grab and run" from vehicle installation.

V60 II Control Unit — INVISIO

Power: Powered by the radio/comms device (3.6 to 36 V DC)
Com ports: Three COM ports
Immersion: 20 meters for 2 hours (MIL-STD-810G)
Weight: 152 grams
Notes: The INVISIO V60 II control unit is designed to be the ultimate communications hub. With 3 com ports and 4 PTT buttons, the control unit can connect into any type of communication device, such as multiple net radios, smart phones, a broad range of audio devices, headsets, and intercom systems for land, sea and air vehicles.

T7 Over-the-Ear Headset — INVISIO

Power: Powered by an INVISIO control unit
Hearing Protection: SNR 28 dB (EN351-2002), NNR 22 nB (ANSI S3.19)
Immersion: 10 meters for 1 hour (MIL-STD-810G)
Weight: 347 grams
Notes: The INVISIO T7 is a submersible and lightweight hearing protection headset available in three interchangeable variants. The T7 is submersible to 10 meters and extremely rugged making it ideal for use in demanding environments. It is powered and controlled by an INVISIO control unit, making it easy to use and lightweight while featuring industry leading situational awareness.

X5 In-the-Ear Headset — INVISIO

Power: Powered by an INVISIO control unit
Hearing Protection: SNR 32 dB (EN352-2:2002), NNR 29 dB (ANSI S3.19)
Immersion: 2 meters for 2 hours (MIL-STD-810G)
Weight: 70 grams
Notes: The INVISIO X5 is a dual sided in-ear hearing protection headset with state-of-the-art external microphones for natural hear-thru and six sizes of exchangeable foam plugs for market leading hearing protection and comfort. It is powered and controlled by an INVISIO control.

MP300 — Kongsberg Defence Systems

Power: 10mW, 0.5W, 5W, 50W/ MRR special waveform
Frequencies/waveforms: 30MHz to 87.975MHz, 2,320 channels
Security: Built-in COMSEC; electronic protective measures including Narrow Band Direct Sequence Spread Spectrum (NBDS) in fixed-frequency operation, frequency hopping, multi-hop packet radio service with automatic routing, multipath integration.
Notes: Software upgradable man-pack for CNR and advanced data network services. Features: up to 19.2kbps data with forward error correction, voice, transparent and packet data, interference cancelling.

AN/PRC-150(C) HF Manpack Radio — L3Harris Tactical Communications

Power: 1W, 5W, 20W PEP, -1/+2dB (1W, 5W, 10W FM)
Frequencies/ waveforms: 1.6MHz to 60MHz/HF features: encrypted data, ALE, frequency hopping, vocoder, data link layer protocol, VHF features: vocoder, encrypted data
Security: US Type-1 and coalition encryption, enhanced frequency hopping
Weight: 4.7kg without batteries
Notes: Falcon II family advanced HF-SSB/VHF-FM secure voice and data manpack radio. Provides up to 9,600bps (HF), and selectable ARQ modes reduce on-the-air transmission time and enhance secure data transmission. In addition to MIL-STD-188-141B ALE, the AN/PRC-150(C) includes STANAG 4538 third generation HF Link Automation.

AN/PRC-152A Wideband Networking Radio — L3Harris Tactical Communications

Power: user selectable 250mW to 5W, 10W satcom mode
Frequencies/ waveforms: 30MHz to 520MHz and 762MHz to 870MHz. NB: AM/FM, VULOS, SINCGARS & HAVEQUICK I/II (standard), HPW, HPW IP, APCO P25 Phase 1 trunking, conventional and OTAR (optional). WB: ANW2C (standard), SRW (optional). UHF satcom: Mil-Std-188-181B dedicated channel is standard, Mil-Std-188-182A, 183A DAMA, Mil-Std-188-181C, 183B IW Phase 1, High Performance Waveform (HPW) & HPW IP, SATCOM TDMA capability waveform, all optional.
Security: Sierra II programmable crypto, secret or sensitive but unclassified
Weight: 1.2kg max with GPS, battery and antenna
Notes: Handheld networking SDR for simultaneous voice and data, including video.

AN/PRC-117G Wideband Multi-band Multi-mission Radio — L3Harris Tactical Communications

Power: NB 10W, satcom 20W; WB 20W peak, 5W average
Frequencies/ waveforms: 30 MHz to 2GHz. NB: AM/FM, VHF/UHF LOS, SINCGARS, Havequick I/II standard, SATURN, APCO P25 & P25 OTAR optional; WB: SRW, ANW2 C, ROVER III L-Band receive (optional)
Security: Sierra II-based, Type 1 encryption for WB/NB NSA-certified top secret and below
Weight: 3.7kg without battery, 5.44kg with
Notes: Software defined tactical radio focused on wideband data, interoperability with fielded waveforms.

Falcon III AN/PRC-158 Multi-Channel Manpack — L3Harris Tactical Communications

Power: Narrowband: 10W, SATCOM: 20W; Wideband: 20W peak, 10W average (max)
Frequencies/waveforms: 30MHz to 2.5GHz NB: VHF 30MHz to 225MHz, UHF 225MHz to 520MHz & 762MHz to 874 MHz. NB waveforms: AM/FM, VHF/UHF LOS, SINCGARS, Havequick, (SATURN, APCO P25 capable). SATCOM: Rx 243MHz to 270MHz, Tx 292MHz to 318MHz. MUOS: Rx 360MHz to 380MHz, Tx 300MHz to 320MHz. WB: 225MHz to 520MHz UHF, 762MHz to 2.5GHz L-band. WB waveforms: SRW, ANW2C.
Security: Sierra II-based, Type 1 (Suite A/B) NSA certified Top Secret and below.
Weight: 5.76kg inc battery.
Notes: Multi-channel man-pack includes MUOS-ready hardware for SATCOM connectivity while on the move. NSA-certified for voice and data up to U.S. TOP SECRET with L3Harris Sierra II encryption, the man-pack is fully JTRS COMSEC and TRANSEC compliant.

RF-330-E-HH wideband networking handheld — L3Harris Tactical Communications

Power: 3.2W max, user selectable
Frequencies/waveforms: UHF: 225MHz to 450MHz, 99 channel presets (L-Band: 1250MHz to 1390MHz and 1755MHz to1850MHz, extension to 2.5GHz optional)/ ANW2C, others available.
Security: Type 3 AES 256 for voice, video & data.
Weight: 0.780kg with battery
Notes: Lightweight radio designed for operations in geographically challenging environments. Can serve as a 'black' relay for secure, encrypted video and data between multiple Type 1 tactical sets. Can be deployed a leave-behind device.

Personal Role Radio (PRR) — Leonardo

Power: 50mW
Frequencies/waveforms: 2.4GHz direct sequence spread spectrum modulation
Security: Encryption optional
Notes: Compact and lightweight PRR with a typical operating range of 500m in open terrain, and through three floors of a building, features wireless press to talk with up to 2m range, operates independently of any infrastructure, interfaces with combat net radios.

Enhanced Personal Role Radio (EZPRR) — Leonardo

Power: 100mW
Frequencies/waveforms: 2.4GHz direct sequence spread spectrum modulation
Security: Encrypted
Notes: Typical operating range is 800m in open terrain, and through three floors of a building; wireless Press To Talk (PTT) with 2m range; features interchangeable switch pack, tailorable audio ancillaries; independent of infrastructure. Enhancements include extended range, more capable antenna, gooseneck antenna, data capabilities, rebroadcast, C2 base station, special purpose ancillaries.

SWave Enhanced Handheld (HH-E) — Leonardo

Power: 5W (50W in vehicles)
Frequencies/waveforms: 30MHz to 512MHz V-UHF/ NB VuLOS V/U AM/FM (STANAG 4204/4205), IP MIL-STD-188-220C (datalink), SelfNET EASY II (EPM/ECCM), SelfNET Networking Soldier Broad band Waveform (WB MANET), SelfNET Narrowband Adaptive Waveform (NB MANET)
Security: Embedded programmable COMSEC up to national restricted and TRANSEC, embedded AES 256 crypto engine, support for custom crypto algorithms.
Weight: 0.63kg with standard battery
Notes: Handheld or body-worn radio for soldier and commander use at platoon or section level, offering simultaneous voice and data communications at the tactical edge, configurable for vehicle use.

Swave MB1 manpack/vehicle radio — Leonardo

Power: Up to 20W, or 50W with vehicle amplifier
Frequencies/waveforms: VuLOS V/UHF AM/FM (NB), MIL-STD-188-220C (data link IP), SINCGARS, HQ I/II , SelfNET EASY II (EPM), DAMA (MIL-STD-181A, MIL-STD-182A, MIL-STD-183, MIL-STD-184 (TACSAT), SelfNET Networking Soldier Broadband Waveform (WB MANET), SelfNET Narrow Band Adaptive WF (NB MANET)
Security: Embedded customisable COMSEC, TRANSEC
Weight: under 8kg inc battery
Notes: Family of reconfigurable man-pack radios for dismounted and vehicular use, supporting wide-band IP voice and data, secure CNR voice and video.

RF-7850M-HH Multiband Networking Handheld — L3Harris Tactical Communications

Power: Selectable 0.25W, 1W, 2W, 5W and up to 10W
Frequencies/waveforms: Narrowband: 30MHz to 512 MHz, Wideband: 225MHz to 512 MHz, AM: 108MHz to 512MHz/ NB: TDMA Networking Waveform (TNW) 25K and 75K; WB: M-TNW, ANW2 C (optional)
Security: Quicklook 1A, 2, 3 and Quicklook-Wide ECCM, 1128bit & 256bit Harris proprietary Citadel AES 128 & 256, Customer Algorithm Modification encryption
Weight: less than 1kg with battery
Notes: Intended for traditional CNR missions, ground-to-air and company and below voice and data comms. Optional 50W amplifier enables use in mid-tier tactical networks. Provides manpack performance in a handheld, interoperable with Falcon II and III sets.

RO Tactical Radio — L3Harris Tactical Communications

Frequencies/waveforms: Defence Information Systems Agency Enhanced Mobile Satellite Services.
Security: NIST certified AES 256 voice and data encryption (can be used by coalition troops).
Weight: 0.510kg without antenna.
Notes: Using Distributed Tactical Communications System satcom service, operator can reach thousands of other RO tactical radios within a 100-250 mile range anywhere with sight of sky. Described as a global push-to-talk satcom tactical handheld radio.

SINCGARS RT-1523 VHF Radio — L3Harris Tactical Communications

Power: 1mW, 100mW, 5W, 50W (with power amplifier)
Frequencies/waveforms: 30MHz to 87.975MHz/ SINCGARS
Security: internal Encryption Module, CT/PT, frequency hopping
Weight: 3.5kg with battery
Notes: Offered in vehicle and man-pack configurations. In the mobile role, the radio works with an embedded tactical data router, and as a man-pack it features a standard point-to-point-protocol interface. Both allow a C2 application to access the tactical internet.

SINCGARS RT-1702 VHF Combat Net Radio — L3Harris Tactical Communications

Power: 1mW (LO), 100mW (MED), 5W (HI), 50W (PA with RFPA power amplifier)
Frequencies/waveforms: NB: STANAG 4204 compliant (SC); WB: SINCGARS (FH)
Security: Country unique Pavilion SINCGARS
Weight: 3.5kg including BB-2590 battery
Notes: Man-pack or vehicle-mount radio that provides situational awareness through real-time maps, location and IP data with an optional, embedded 12-channel GPS.

Tactical Network Rover (TNR) — L3 Harris Communications Systems West

Notes: Handheld transceiver that provides a multi-megabit, bidirectional data link capability to dismounted combat troops. Combines video downlink receiver functionality with broadband IP networking capability. TNR uses the existing ROVER communications infrastructure for air-to-ground interoperability and ground-to-air networking within a Net-T network, supporting digitally aided close air support, ground force position sharing, chat and large file transfers.

Tactical Network Rover e (TNRe) video receiver — L3 Harris Communications Systems West

Frequencies/waveforms: Supports UHF, L-, S-, C- and Ku-Band operations/ capabilities include DDL, DVB-T, Tactical, BE-CDL, CDL, Legacy digital, 466ER, VNW and FM analog
Security: NSA-approved Type 1 and AES encryption
Notes: Small-form-factor hand-held radio provides full bidirectional connectivity to vehicles or the dismounted user. Receives full-motion video and sensor data, enables secure digital video, chat, VoIP and other network-enabled applications. Fully interoperable with ROVER. Antenna can be connected directly to radio or remotely through cables.

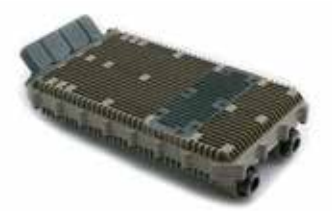
CRE2-189, GCS RADIO TRANCEIVER AND ANTENNA — Radionor

Power: 19-55 VDC/250W
Frequencies/waveforms: 4.900 -5.900 GHz
Security: COMSEC and TRANSEC provided by digital beam-forming and AES-256 encryption embedded in hardware
Weight: 12,5 kg
Notes: Phased array wireless data-link. Maximum data capacity 15 Mbps. IP based. Long range, exceeding 200 km. Vertically mounted panel with radio transceiver and antennas ideal for vessels and semi-mobile installations. The unit is fully compliant with the very most demanding class of electromagnetic compatibility and immunity according to MIL-STD-461F. Water ingress protection is IP67 (Submergible).

CRE2-179-UAV, UAV RADIO TRANSCEIVER AND ANTENNA — Radionor

Power: 19-55 VDC/250W
Frequencies/waveforms: 4.900 -5.900 GHz
Security: COMSEC and TRANSEC provided by digital beam-forming and AES-256 encryption embedded in hardware
Weight: 2 kg
Notes: Phased array wireless data-link. Maximum data capacity 15 Mbps. IP based. Long range.Horizontally mounted panel with radio transceiver and antennas ideal for UAV applications.The antenna panel has the same properties as CRE2-179, but with significantly lower weight adapted for UAV applications. The unit is fully compliant with the very most demanding class of electromagnetic compatibility and immunity according to MIL-STD-461F. The product has also been tested to all relevant parts of environmental requirements according to DO-160G. Water ingress protection is IP67 (Submergible).

CRE2-144-M2, HELMET MOUNTED RADIO — Radionor



Power: 9-36 VDC
Frequencies/waveforms: 4.900 -5.900 GHz
Security: COMSEC and TRANSEC provided by digital beam-forming and AES-256 encryption embedded in hardware
Weight: 295g
Notes: C-band phased array tactical wireless radio. IP centric/ad hoc network operations. Compact radio transceiver and antennas ideal for portable or man-carried applications. The radio/antennas have very low weight and are to be mounted on top of a helmet. The radio has two Ethernet connections and military grade rugged for harsh environments with a special easy-to-clean connector for mud and dust. The unit is waterproof including full submerging in water (IP68). The unit also has built-in GPS and options for insertion of short range wireless interfaces to connect to user terminal equipment such as PCs, pads, and mobile terminals.

COMP@N H07 VHF/UHF handheld — Radmor

Power: Max 5W (FM, programmable), max 6W (PEP)
Frequencies/waveforms: 20MHz to 520MHz and 30MHz to 137MHz/
DV Reutech narrowband waveform providing secure voice transmission, 25kHz channels, digital voice transmission, 100 hops per second in frequency hopping mode, fixed frequency. Analog voice transmission at a fixed frequency in FM and AM, Radmor Serial Data (RSD) data transmission.
Security: TRANSEC & COMSEC cryptographic protection, AES-256 voice protection
Weight: < 1kg
Notes: Handheld SDR radio, developed using a common hardware platform for all COMP@N family radios, on which there are a number of waveforms implemented. H07 is designed for voice communication, including: tactical short-range VHF and UHF communication for land forces; tactical short-range communication VHF for air force; communication with civilian services.

COMP@N H08 — Radmor

Power: Programmable FM max 5W, programmable AM max 4 W-PEP, CPM (W2FH): 0.1W, 1W, 5W
Frequencies/waveforms: 20MHz to 520 MHz and 30MHz to 13MHz7W2FH (Waveform with Frequency Hopping) – narrowband EPM (Electronic Protective Measures) waveform that can operate in the frequency hopping mode or at fixed frequency, STANAG 4204 - fixed frequency VHF FM, STANAG 4205 - fixed frequency UHF FM/AM
Security: TRANSEC & COMSEC cryptographic protection
Weight: < 1kg
Notes: Handheld SDR developed using a common hardware platform for all COMP@N family radios. W2FH waveform allows simultaneous transmission of voice and data, while the synchronization mechanism does not require GNSS.

COMP@N H09 — Radmor

Power: Programmable FM, max 5W, programmable AM, max 4 W-PEP, CPM (BMS IP WF): 0.1W, 1W, 5W
Frequencies/waveforms: 20MHz to 520 MHz / 30MHz to 137MHz/ BMS IP WF – narrowband MANET waveform that can operate in frequency hopping mode or at fixed frequency, STANAG 4204 – working at a fixed frequency VHF FM, STANAG 4205 – working at a fixed frequency UHF FM/AM.
Security: TRANSEC & COMSEC cryptographic protection
Weight: < 1kg
Notes: Handheld SDR developed using a common hardware platform for all COMP@N family radios. Has implemented several waveforms, which allow a smooth transition from classical systems to modern BMS. BMS IP WF allows integration with IP networks, simultaneous voice and data transmission.

BNET-MPS/V — Rafael Advanced Defense Systems

Power: 5W/20W (BNET-MPS), 50W per channel (BNET-V)
Frequencies/waveforms: Narrowband waveform 30MHz-88MHz, 225-512MHz (108MHz-174MHz) optional. Wideband waveform 225MHz-512MHz (L-band/S-band optional). Can support additional waveforms.
Security: Networking ECCM capabilities, frequency hopping spread spectrum techniques.
Weight: 6kg (BNET-MPS), 13kg (BNET-V)
Notes: The BNET-MPS is the manpack member of the overall BNET family with the BNET-V being its vehicular counterpart.

Microlight DH500 — Raytheon

Power: 0.1W to 4W
Frequencies/waveforms: 225MHz to 2GHz/ Eight-hop relay, CPSM with DSSS, TDMA, CDMA and FDMA
Security: supports commercial Advanced Encryption Standard (AES) for Secure But Unclassified (SBU) transmission
Weight: 0.76kg
Notes: Provides simultaneous voice, data and video, automatic position location reporting, giving commanders the ability to see the location of all people and assets at all times, even in GPS-denied environments.

EPLRS-XF-I — Raytheon

Power: 50W max
Frequencies/waveforms: 225MHz to 450MHz/ enhanced positioning, TCP/IP MANET
Security: AES encryption
Weight: 8kg
Notes: Man-pack vehicle and airborne EPLRS radio providing robust, on-the-move, high-speed,
automated data exchange using a contention-free networking architecture.

EPLRS-XF-I (lightweight) — Raytheon

Power: 10W to 20W
Frequencies/waveforms: 30MHz to 512MHz, 142 channel pre-sets/ SINCGARS, SATCOM, DAMA, HAVEQUICK I/II, AM, FM, FSK, B/SB/DESB/SOQ PSK
Security: embedded encryption engine, embedded COMSEC for voice and data
Weight: 5.2kg
Notes: Provides lightweight, secure, network-capable, multi-band/multi-mission, anti-jam, voice/ imagery/ data communications capability in a single package.

TR3000 — Reutech

Power: 150W
Frequencies/waveforms: 1.5MHz to 32MHz Secure Digital Voice 3G STANAG 4538 Packet Data WBHF MIL-STD-188-110D (up to 240 kbps) Frequency Hopping
Security: AES256, optional fit user definable tamper proof INFOSEC, TRANSEC module
Weight: < 10kg
Notes: Direct RF sampling digital architecture

MTR1025 Manpack — Reutech

Power: 30W
Frequencies/waveforms: 1.6MHz to 30MHz, HF
Security: User definable tamper proof INFOSEC, TRANSEC module
Notes: Features integrated texting from front panel, CNIS Link-ZA compliant data link, Bluetooth for peripherals, auto GPS position reporting, ALE to MIL-STD-188-141A, APP A, data to MIL-STD-188-110A and STANAG 4285 local/ networked RC, built-in antenna tuning, Li-ion battery with gauge.

SOVERON® D – Streitkräftegemeinsame verbundfähige Funkgeräteausstattung SVFuA — Rohde & Schwarz

Power: modular
Frequencies/waveforms: Certified for SCA 2.2.2, the SOVERON® D radio platform is prepared for porting future and legacy waveforms. It is accompanied by a high-performance waveform family, such as SOVERON® WAVE. SOVERON® D will also use the ESSOR high data rate waveform that was developed within the framework of the trans-European interoperability initiative for armed forces at the tactical level, an initiative the Federal Republic of Germany has joined. In addition, the NTN (National Tactical Network waveform)-family is fielded with SVFuA in the German Armed Forces.
Security: The SOVERON® D 'software-defined-crypto' platform allows a flexible lifecycle of encryption methods. Robustness against jamming attacks with TRANSEC fast frequency hopping measures. Support for 'multi-level security' MLS. Transmission of voice and data with confidentiality up to level SECRET. SOVERON® D, known from the SVFuA development project of the German MoD features scalable security layer up to national and NATO SECRET.
Notes: SOVERON®D is a highly modular SDR developed for the sovereign needs for tactical communication of the German Armed Forces. SOVERON® D manages communication networks through all echelons, with a special focus on joint and combined missions with multi-level security needs, supporting operations conducted by coalition forces. The system connects the vehicle IT infrastructure with the tactical command and control system.

SOVERON® VR — Rohde & Schwarz

Power: All modes: 50 W; A3E carrier: 12.5 W.
Frequencies/waveforms: The core of the SOVERON®VR vehicular radio is an SCA 2.2.2 radio platform that supports standardized, legacy and Rohde & Schwarz proprietary waveforms and makes it easy to port waveforms. In addition, it allows customized waveforms and cryptology to be implemented. Frequency range from 30 MHz to 512 MHz without gaps.
Security: Strict red/black separation. Crypto ignition key support. Ad-hoc networking (MANET) capability. Frequency hopping (TRANSEC). AES encryption (COMSEC)
Notes: SOVERON® VR has been designed for use in vehicles and for integration into semi-stationary and stationary applications. Its ruggedized hardware meets applicable MIL-STD environmental and EMC requirements, enabling the radio's use under extreme conditions such as in armored wheeled vehicles and tracked vehicles. Together with the SOVERON® HR handheld tactical radio, SOVERON® VR forms a seamless connection to peers and the higher echelons on the battlefield to provide a common operational picture.

SOVERON® HR — Rohde & Schwarz

Power: High: 5 W; Medium: 2 W; Low: 0.2 W
Frequencies/waveforms: Frequency range from 30 MHz to 512 MHz without gaps
Security: Ad-hoc networking (MANET) capability. Frequency hopping (TRANSEC). AES encryption (COMSEC)
Weight ≤ 1.2 kg (2.65 lb) [with Battery? Without?]
Notes: The SOVERON® HR is a multiband handheld radio system that supports up to two voice channels and IP data transmission in parallel. It has been designed for use by dismounted soldiers, leaders and specialists under harsh field conditions in an electromagnetically contested environment. Its ruggedized hardware surpasses MIL-STD environmental and EMC requirements. Together with the SOVERON® VR vehicular radio, the SOVERON® HR handheld tactical radio forms a seamless connection to peers and the higher echelons on the battlefield to provide a common operational picture.

Badger HU Combat Net Multiband (HF/VHF/UHF) — Sat-Com Secure and Tactical Communications

Power: 30W PEP @ (1.6-30MHz). 18W PEP @ (30-88MHz). 10W PEP @ (88-512MHz
Frequencies/waveforms: 1.6-512MHz
Modulation: FM, USB/LSB, AM, FSK, MSK
Advanced Modem: BPSK, QPSK, PSK, QAM, DSSS* C
Security: OMSEC: Encrypted AES256 Digital Voice
Transec: OTP / AES128, 1-600 hops per second.
Nets: 8-digit decimal Mission Key.
Linking: Ad hoc channel scan / ALE
Enhanced Features: TacTalk - Messaging, Chat, E-mail, File Transfer. TacTalk-plus - Messaging, Chat, E-mail, File Transfer plus Frontline Battlefield awareness
Weight: 5.8kg (including Battery)
Note: The Badger has been specifically designed to be rack or panel mounted, an extension kit facilitates mounting in standard 19" rack. Perfect for Naval or Mobile installations. COMSEC (SDV) and TRANSEC(FFH) Modes on Scanning or ALE . All HF/VHF/UHF Features are interoperable with the Satcom suite of radios.

Cheetah 3 VU Combat Net Multiband (VHF/UHF) — Sat-Com Secure and Tactical Communications

Power: 10W
Frequencies/waveforms: 30-512MHz
Modulation: USB/LSB, AM, FM, FSK, MSK,
Advanced Modem: BPSK, QPSK, PSK, QAM, DSSS
Security: Encrypted AES256 Digital Voice
Transec: OTP / AES128, 1-600 hops per seco
Nets: 8-digit decimal Mission Key.
Linking: Ad hoc channel scan / ALE
Enhanced Features: TacTalk - Messaging, Chat, E-mail, File Transfer.
TacTalk-plus - Messaging, Chat, E-mail, File Transfer plus Frontline Battlefield awareness
Weight: 2.98kg (including Battery)
Note: COMSEC (SDV) and TRANSEC(FFH) Modes on Scanning or ALE . All VHF/UHF Features are interoperable with the Satcom suite of radios.

Leopard HU Combat Net Multiband (HF/VHF/UHF) — Sat-Com Secure and Tactical Communications

Power: 30W@(1.6-30MHz),18W@(30-88MHz),10W@(88-512MHz)
Frequencies/waveforms: 1.6-512MHz
Modulation: FM, USB/LSB, AM, FSK, MSK.
Advanced Modem: BPSK, QPSK, PSK, QAM, DSSS*
Security: COMSEC: Encrypted AES256 Digital Voice
Transec: OTP / AES128, 1-600 hops per second.
Nets: 8-digit decimal Mission Key.
Linking: Ad hoc channel scan / ALE
Enhanced Features: TacTalk - Messaging, Chat, E-mail, File Transfer.
TacTalk-plus - Messaging, Chat, E-mail, File Transfer plus Frontline Battlefield awareness.
Mounting: Backpack, Mobile Racks, Base Racks, Custom Solutions
Weight: 4.5kg (including Battery)
Note: COMSEC (SDV) and TRANSEC(FFH) Modes on Scanning or ALE . All HF/VHF/UHF Features are interoperable with the Satcom suite of radios.

AN/PRC-148 MBITR/JEM — Thales

Power: 0.1, 0.5, 1.0, 3.0 and 5.0W user selectable (waveform dependent)
Frequencies/waveforms: 30MHz to 512MHz contiguous . Implemented and planned waveforms and modes include: AM/FM, Havequick I/II, MIL-STD-188-241-1/-2 (SINCGARS), MIL-STD-188-181B (56kbps), MIL-STD-188-181C, -182B, -183B (SATCOM IW), ANDVT, Project 25, Over The Air Cloning (OTAC), retransmission
Security: Programmable encryption engine supports NSA crypto modernisation requirements, certified by NSA.
Weight: 0.867kg with battery
Notes: An evolution of the combat- proven AN/PRC-148 MBITR, the JEM is a JTRS-approved production radio, is part of a complete communications system for mounted and dismounted operations.

AN/PRC-148B MBITR2 — Thales

Power: 5 W in all frequencies
Frequencies/waveforms: 30MHz to 512MHz , Soldier Radio Waveform (SRW) , MIL-STD-188-241-1/-2 (SINCGARS - Standard/ FH2 EOM), MIL-STD-188-181C, -182B, -183B (SATCOM IW) , HAVEQUICK I and II, ANDVT (LPC-10, MELP), AM/FM, Project 25.
Security: Programmable encryption engine supports NSA crypto modernisation requirements, certified by NSA.
Weight: 1.225kg
Notes: Combines AN/PRC-148 and AN/PRC-154 wideband tactical handheld radio capabilities to integrate dismounts into the wideband tactical IP and voice network via the SRW, simultaneously connecting with older nets via narrowband.

AN/PRC-6809 Multi-Band Inter/intra Team Radio — Thales

Power: 0.1W to 5.0W
Frequencies/waveforms: 30MHz to 512 MHz contiguous , Havequick II frequency hopping ECCM waveform, country-specific ECCM waveforms
Security: Type 3 DES (optional), 256-bit AES (optional)
Weight: 0.867kg
Notes: Non-Type 1 version (without NSA approved cryptographic algorithms) of the AN/PRC-148 compatible with all MBITR family products and available to US, allied and coalition forces.

AN/PRC-154A Rifleman Radio — Thales

Power: User selectable up to 5W
Frequencies/waveforms: 225MHz to 450 MHz (UHF band), 1,250MHz to 1,390MHz and 1,750MHz to 1,850MHz (L-band); supports SRW
Security: Programmable COMSEC and TRANSEC NSA certified for Type 1 secret and below, non-CCI.
Weight: 0.771kg with battery
Notes: Low-cost, body-worn radio that transmits voice and data simultaneously using the SRW, bringing secure secret and below squad-level communications to the soldier at the tactical edge, enables situational awareness and blue force tracking.

AN/PRC-154B Rifleman Radio — Thales

Power: user selectable up to 5W
Frequencies/waveforms: UHF band 225MHz to 450MHz, L-Band 1250MHz to 1390 MHz, 1750MHz to 1850 MHz/ Soldier Radio Waveform (SRW)
Security: embedded encryption, COMSEC, TRANSEC
Weight: 0.771kg with battery
Notes: Increased RF range, battery life, and added visual HMI display built on the successful and field proven AN/PRC-154A Program of Record Rifleman Radio

BCC 67 Panther VHF Manpack Radio — Thales

Power: selectable up to 5W or 20W boosted mode in vehicle configuration
Frequencies/waveforms: 30MHz to 108MHz
Security: Secured voice and data 16kbps digital encryption, high EPM protection including frequency hopping, free channel search and mixed mode
Weight: 5.9kg with battery
Notes: Interoperable with Jaguar radios. Battery life: 32 hours with rechargeable Li-Ion battery pack. Advanced CNR services including group selective call, alert, authentication, passive late entry, over-the-air rekeying

F@stnet Twin — Thales

Frequencies/waveforms: VHF and UHF
Notes: F@stnet Twin keeps infantry leader in touch with soldiers through the embedded UHF soldier channel while being continuously in touch with the commanding level thanks to the embedded VHF channel. Designed for inter-operability with legacy waveforms; handles simultaneous voice and data.

SquadNet soldier radio — Thales

Frequencies/waveforms: 865MHz to 880MHz, 100 talk groups over 50 channels with up to 50 users per channel/
Security: programmable encryption with red/black architecture
Weight: 250 including battery
Notes: "Unique" waveform ensures communication is maintained across urban, wooded and mountainous terrain. In open terrain SquadNet gives a 2.5km range point-to-point, extending to 6km with automatic network relaying, maintaining secure comms over IP networks with an Android app

BATS-D AN/PRC-161 Handheld Link 16 Radio — ViaSat

Power: 8W or 8mW transmit power
Frequencies/waveforms: Link 16 Voice/Data waveform enables 26.8kbps through 1102 kbps TADIL J coded, free text variable format for enhanced throughput
Weight: 1kg including battery
Notes: Radio fuses air and ground Situational Awareness (SA) in a handheld package designed for use at the tactical edge. Designed to be used vest-worn, handheld, or mounted by special operations and expeditionary forces, including Joint Terminal Attack Controllers (JTACs), Forward Air Controllers (FACs), Tactical Air Control Party (TACPs), as well as size, weight, and power constrained platforms.

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