

Highband Networking Radio (HNRv2)



Designed for the Military

Envisioned to satisfy the Army's LandWarNet radio transmission needs, the Highband Networking Radio (HNR) hosting the Highband Networking Waveform (HNW) is designed specifically for high throughput and ease of use. The HNR consists of two elements: a Baseband Processing Unit (BPU) and a Highband RF Unit (HRFU). The HNR is designed to be configured for military fixed site, At-The-Halt (ATH) and On-The-Move (OTM) communications for black or colorless core ad hoc (self-forming and self-healing) network backbones on the battlefield. Currently fielded by the U.S. military in tactical environments, having achieved Authority to Operate (ATO) by U.S. CENTCOM, HNR employs directive beam antennas to extend range, improve throughput, and provide battlespace spectral efficiency with frequency reuse. Directive beam antennas also provide inherently Low Probability of Intercept and Detection (LPI/LPD) capability.

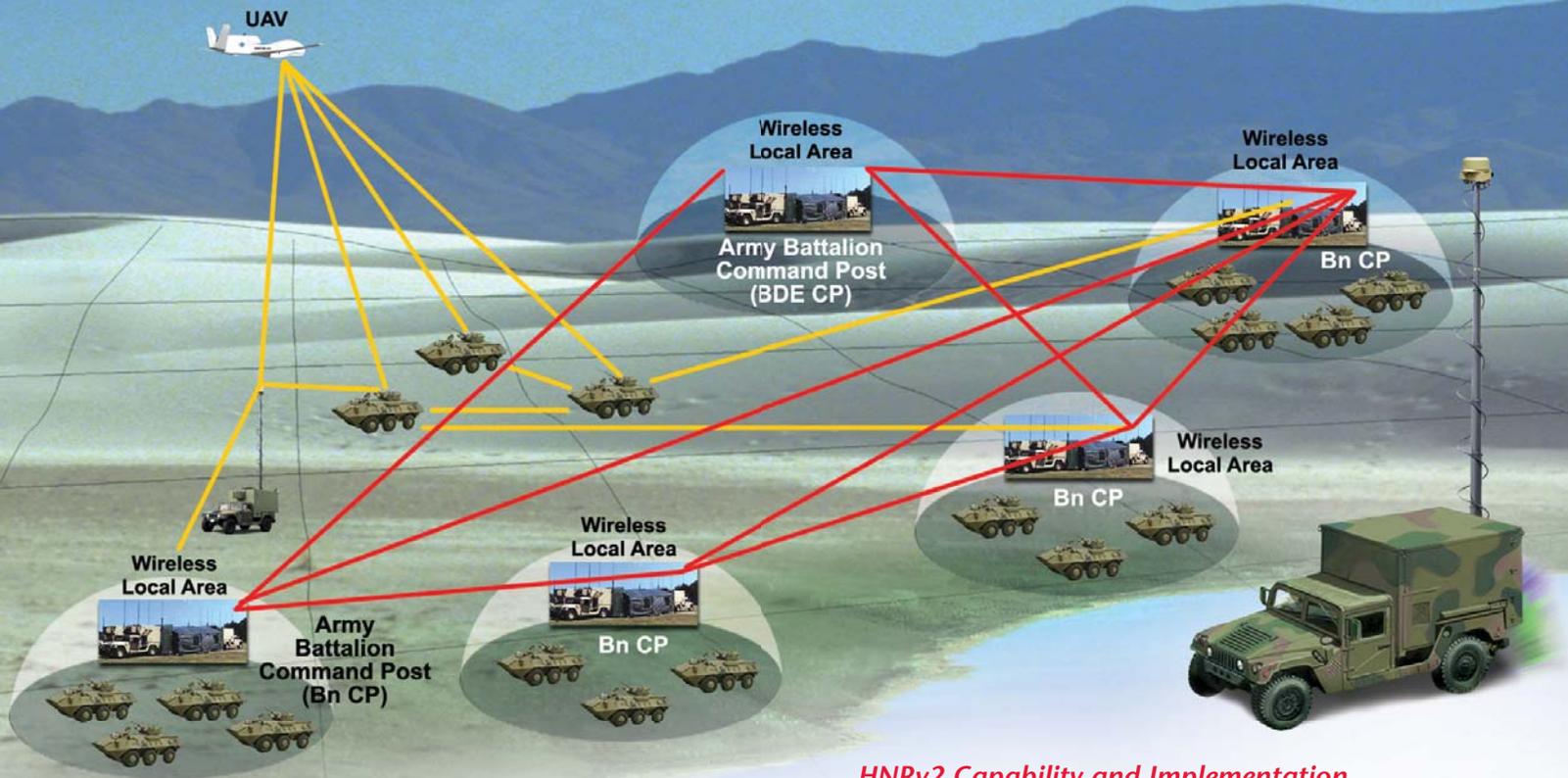
CONOPS

The HNR was created to provide high bandwidth, long range line-of-site connectivity between users of widely dispersed Local Area Networks (LAN). In this way, the HNR implements a wireless Wide Area Network (WAN) that connects LANs and their users together. The HNR is versatile and configurable enough for small combat unit applications as well as inter-battalion/brigade black core network backbone applications, operating with equal effectiveness when

static, ATQH (At-The-Quick-Halt) or OTM (On-The-Move). HNR has been designed to work in both air and ground tiers of a battlespace to provide seamless, self-forming, self-healing connectivity between all users. Although the HNR has primary applicability to the wide area scenario, it can be used to provide high data rate user access in localized areas where operational command centers are numerous and node concentration is high. HNR operation from preset defaults requires only power-up to join a mobile ad hoc networking mesh for extremely fast communications deployment.

HNRv2 Characteristics

- Ease of Use: Self-forming and self-healing mesh network
- Burst rates of 6 to 54 Mbps; up to 30 km; full hemispherical coverage
- Mobility: OTM, ATH, and fixed site operation
- COMSEC: External HAIP ready
- TRANSEC: AES FIPS 140-2 Level 2 certified
- Flexibility: Integrated or separated HRFU for vehicle, UAV, remote and static antenna applications; up to 150-foot BPU/HRFU separation
- BPU: ½ ATR; 4.9" x 8.5" x 14.2"
- HRFU: 20" x 20" x 15"
- Significant network frequency reuse
- Power: 180 W—BPU; 90 W—HRFU



Flexible Architecture

The HNR can be deployed at fixed or nomadic command posts, on vehicles for At-The-Quick-Halt (ATQH) or On-The-Move (OTM) operation, or on aircraft for extended range and where terrain is complex. This allows for formation of a high capacity backbone that can extend through all echelons to deliver critical voice, video, and data to the warfighter.

Inertial Navigation Unit (INU), a GPS, and the HNRv2 combine to form a mobile HNW network node. The mobile node can be deployed on vehicle and aircraft platforms to support operation while the platform is in motion.

System Interfaces

The HNRv2 operates from military vehicle 28 Vdc power. HNR provides user friendly front panel LEDs for radio and network status. Each HNR can be configured and monitored either locally or remotely by the HNR GUI based Radio Manager application, which runs on any JAVA Runtime Environment computer. The HNR default parameters allow ad hoc network formation and operation without operator intervention, but the Radio Manager provides access for monitoring performance, for setting the AES TRANSEC encryption keys, and for reconfiguring radio parameters when desired. Data interface to the internal router is via two IEEE 802.3-1998 10/100 Base Tx female connectors. The INU interface is TALIN 3000 and 5000 compatible. The HNR has a buffered 1 PPS industry standard interface. The GPS interface is NMEA-0183 data format (GPGGA and GPRMC sentences) and the 1 PPS is synchronized to UTC. There is a three-position switch with accidental actuation protection—momentary action; de-bounce for reset of the BPU and for Tx enable. The HNR RF interface is C-band at 4.5 to 4.99 GHz. The HNR BPU can be separated from the HNR HRFU by up to 150 feet with the RF system cabling.

HNRv2 Capability and Implementation

Performance Parameter	Capability
Radio (BPU) SWaP	½ ATR form factor (4.9"x8.5"x14.2") 14 lbs +20 to +33 Vdc 180 W
Highband RF Unit (HRFU) SWaP	20" x 20" x 15" 60 lbs +20 to +33 Vdc 90 W
Current Band	C-band (4.5 to 4.99 GHz)
Occupied Bandwidth	22 MHz
RF Coverage	Full hemispherical
Tiers	Air and ground
Operational Modes	Warm-up Silent Watch; MANET operation
Network Modes	Point-to-Point; MANET; Managed Topology
Network Size	Easily supports battalion-size network configurations
Router	Internal to BPU, MANET IOS OSPF or EIGRP router protocols PPPoE OSPF.v3 interfaces
AES TRANSEC Cover	AES 256 bit; AES FIPS 197 certified FIPS 140-2 Level 2 certified
Modem	TDD/TDMA OFDM
Modulations	BPSK, QPSK, 16 QAM, 64 QAM with ½ and ¾ rate coding
Data rate adaptation	8 burst rates from 6 to 54 Mbps
Range	Ranges up to 30 km
Environmental	
Sheltered Equipment	+20°F to 110°F (extended temp option available)
Antenna	-35°F to 120°F (includes full solar loading)
Antenna Electronics	-35°F to 120°F (includes full solar loading)
Reliability: MTBF	>6500 hrs (based on actual performance)



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