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Seamless Everywhere IDCITI

uGPS™

IDCITI uGPS™
— The Next Standard of Positioning Infrastructure

IDCITI provides an advanced geospatial infrastructure platform based on high-precision GNSS signal regeneration technology, purpose-built to eliminate the inherent limitations of satellite navigation in GPS-denied environments.

By generating fully authenticated GNSS signals within tunnels, underground structures, and high-density urban corridors, the uGPS™ system ensures continuous, satellite-grade positioning across indoor and outdoor domains.

Interoperable with all GNSS-enabled devices—smartphones, in-vehicle navigation units, ADAS/AD platforms, and robotic systems—uGPS™ requires no hardware modification or software integration. Its ultra-low-latency architecture, high availability, and infrastructure-grade reliability make it a foundational enabler for smart mobility, resilient infrastructure, and next-generation urban systems.

IDCITI is advancing the global standard for positioning continuity and driving the future of connected, autonomous ecosystems.

uGPS™

Underground GNSS — Expanding the Reach of Precision

The Challenge

GNSS performance degrades significantly in environments obstructed by satellites. Tunnels, underground facilities, dense urban structures, and enclosed spaces cause signal attenuation and multipath effects, resulting in inconsistent or unreliable positioning where precision is essential.

The Solution

IDCITI uGPS™ addresses these limitations through the authenticated extension of GNSS into previously inaccessible domains. By eliminating positional blind zones, uGPS™ delivers uninterrupted, high-precision geolocation across all operational environments—enhancing safety, ensuring operational continuity, and enabling advanced automation across critical infrastructure.

No signal attenuation. No coverage gaps. Continuous, dependable GNSS—where conventional systems fail.

What makes uGPS™ revolutionary?

uGPS™ establishes a new class of indoor and subterranean geolocation technology. Unlike conventional GPS repeaters—which simply retransmit weakened RF signals—IDCITI's uGPS™ regenerates authentic GNSS waveforms using SDR-based architectures. This approach ensures satellite-grade precision without the drift, instability, and dropouts inherent to legacy repeater systems.

Optimized for tunnels, large underground complexes, and dense metropolitan corridors, uGPS™ functions as an integrated geospatial layer, enabling reliable and continuous high-accuracy positioning in environments traditionally incompatible with GNSS.

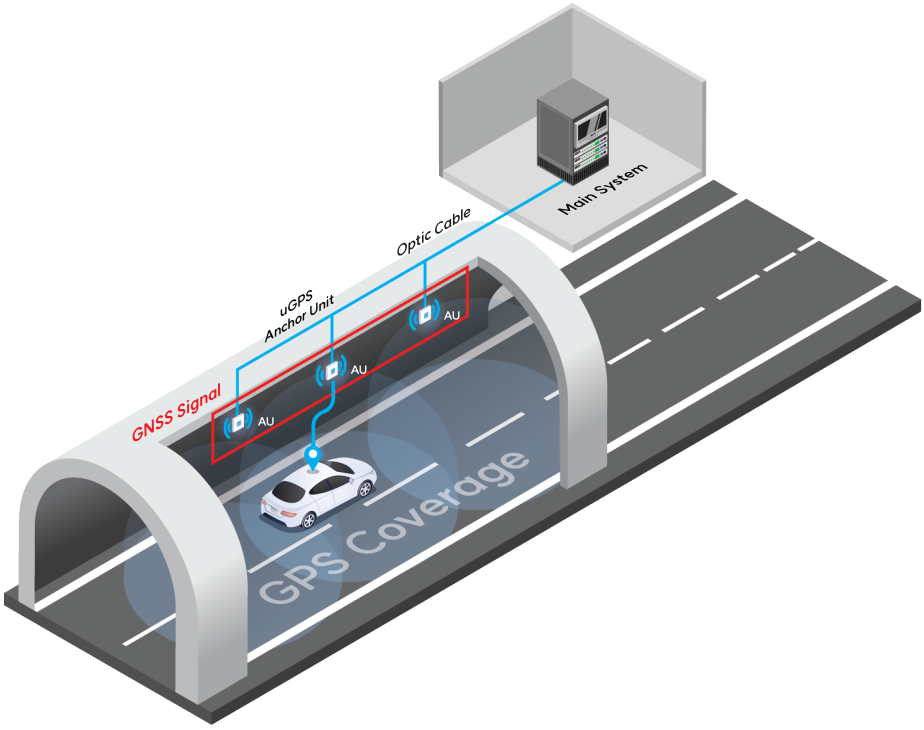
Seamlessly interoperable with all GNSS-enabled devices—including smartphones, vehicle navigation units, unmanned systems, and autonomous platforms—uGPS™ enables continuous positioning that supports the evolution of smart mobility, critical logistics, and resilient urban infrastructure.

GNSS repeater Vs. uGPS™

Feature	Conventional GPS Repeater	IDCITI uGPS
Signal Type	Just retransmission	**Authentic GNSS signal generation (SDR-based)**
Accuracy	Inconsistent, especially indoors	**Within 3 meters (1 meter with RTK)**
Device Compatibility	Limited, often proprietary	**Fully compatible with smartphones, car navigation, drones**
Seamless Handover	Signal drops at entry/exit	**Zero-lag indoor-outdoor transitions**
Coverage	50–200 meters max	**Up to 40 kilometers**
Maintenance	Frequent checkups, high complexity	**Remote OTA updates, minimal cost**

Engineered for scalability, operational reliability, and long-term lifecycle support, uGPS™ underpins mission-critical applications across autonomous mobility systems, logistics operations, aerial robotics, industrial automation, and smart-city infrastructure. With seamless indoor-to-outdoor handover and reduced maintenance overhead, uGPS™ defines the new benchmark for geospatial continuity and positions IDCITI as a core technology provider for the next generation of connected infrastructure.

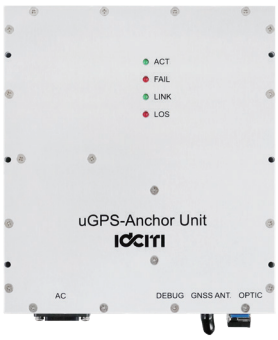
uGPS™ Configuration



The uGPS™ system comprises two primary components : **the Main System and the Anchor Units (AUs)**. The Main System is further divided into three modules—the Receiver Unit (RU), Master Unit (MU), and Control Unit (CU).

With nanosecond-level synchronization precision and timing accuracy better than 4 nanoseconds, the system ensures stable, high-speed positioning and seamless connectivity even within tunnels and other indoor environments.

uGPS™ Anchor Units



▪ uGPS™ Anchor Unit and Antennas

Anchor Units (AUs) can be flexibly installed at intervals of 50 to 200 meters, enabling rapid adaptation to diverse site conditions. Each AU functions as a single signal node connecting antennas for an optimal GNSS distribution.

With this streamlined architecture, we deliver continuous, 100% seamless GNSS coverage and highly reliable positioning performance in the most challenging tunnel or indoor environments.

Category	Specification
Signals Supported	GPS L1 C/A, GLONASS L1OF (Galileo E1, BeiDou B1C)
Update Rate	12 Hz (single-constellation) / 10 Hz (multi-constellation)
Transmit Power	–80 to –20 dBm (adjustable in 0.5 dB steps, ±0.5 dB accuracy) Example: –50 dBm at 50 m intervals in Suri Tunnel– configurable per tunnel geometry
Timing Accuracy	Phase alignment within ±20 ns via 1 PPS / 10 MHz reference signals Maintains seamless synchronization across all AUs with real-world positioning accuracy
Interfaces	SMA type RF output, can firmware update using network

uGPS™ Main System

▪ Master Unit (MU)

Category	Specification
Processor	Quad-core Arm Cortex-A75 @ 1.8 GHz
Memory	16 GB DDR4
Storage	128 GB eMMC + SD card slot
Networking	2× Gigabit Ethernet (PoE optional), LTE modem
I/O Ports	13 x USB 3.0, 13 x SFP
Operating System	Linux
Security	TLS encryption, SSH access, 2FA CLI/API, secure boot, VLAN isolation
OTA Capability	Firmware & configuration updates via remote management

The Master Unit (MU) controls all core timing and signal generation, delivering stable, real-time control across the entire uGPS™ infrastructure.

▪ GNSS Receiver Unit (RU)

Category	Specification
Function	Provides live-sky GNSS ephemeris, clock offset data, and 1PPS / 10MHz timing signals to the MU
Constellations (Current)	GPS L1 C/A, GLONASS L1OF
Output Signals	1 PPS / 10 MHz
Data Interface	Gigabit Ethernet

The Receiver Unit (RU) acquires live-sky GNSS signals at the tunnel entrance and delivers precise ephemeris and timing data to the Master Unit (MU), ensuring nanosecond-level system synchronization.

▪ Control Unit (CU)

Category	Specification
Function	Computation and management of AU coordinates based on RINEX data. Comprehensive system status monitoring and logging.
Interfaces	13 x USB, 1 x Gigabit Ethernet
Capacity	1 PPS / 10 MH
Power	MAX 200W

The Control Unit (CU) serves as the system's central processing hub, computing signals with precise timing and positional accuracy. One CU can efficiently manage up to 12 Anchor Units (AUs).

Smart. Seamless. Scalable.

Total Coverage — Anywhere

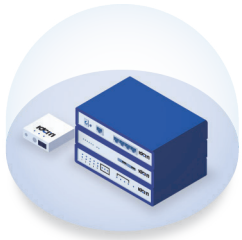
Tunnel, underground, indoors — full GNSS coverage with no blind spots.

Effortless Integration

Works with existing GNSS-enabled devices.
No apps, no new hardware. Just GNSS — everywhere.

Seamless Signal

From outdoors to tunnel and back.
Zero interruption. Zero delay.



Unrivaled Scalability

Cover up to 40km.
Modular Anchor Units (AU) expand coverage as needed.

Rugged and Reliable

IP56 rating, -30°C to +60°C. Built for harsh environments.

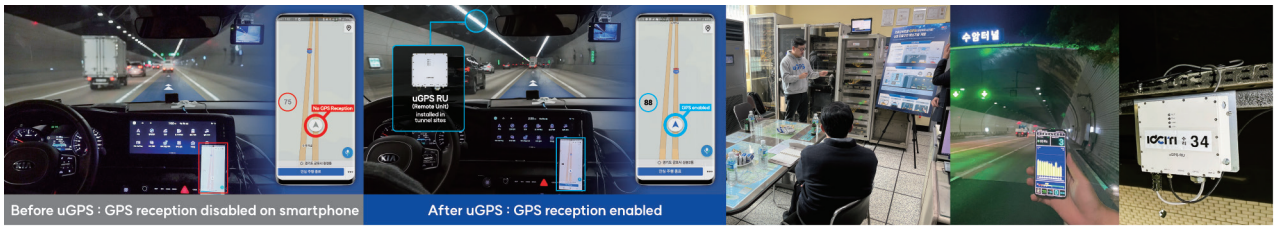
Certified & Proven Worldwide

NET, KC, FCC, CE certifications.

The Only Solution Vetted in Real-World Operation

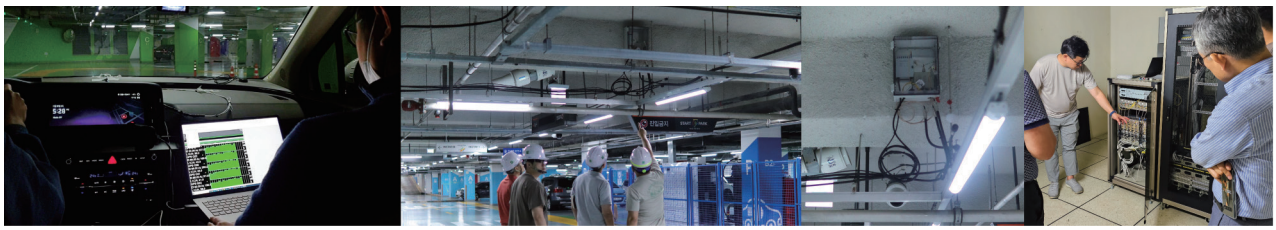
IDCITI uGPS™ has fundamentally redefined the paradigm of pervasive GNSS continuity across mission-critical operational environments. Its performance has been rigorously validated in diverse, constrained settings—from high-velocity expressways to complex subterranean infrastructure—establishing reliable functionality where legacy GNSS protocols typically suffer critical service degradation.

Tunnel Navigation and Vehicle Tracking



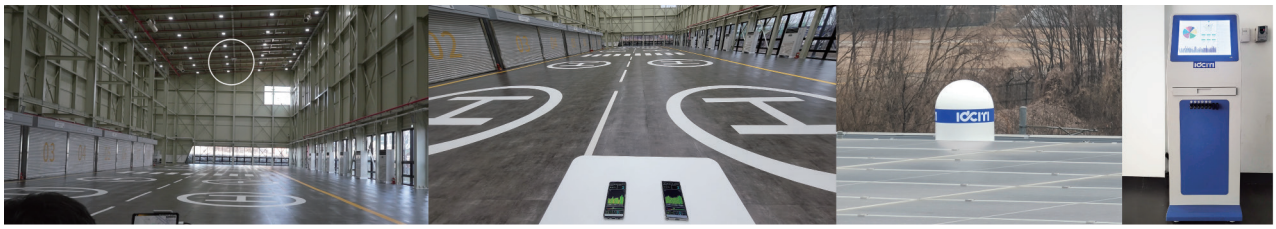
Product | uGPS™ -tunnel
Example | Suri-Suam Tunnel, Cheongha Tunnel, South Korea
Benefits | • Seamless positioning in GNSS blind spots
• Smooth signal transition through the tunnel entry and exit
• Enhanced navigation accuracy and driver safety

Underground Parking Guidance and Navigation



Product | uGPS™ -parking
Example | Incheon Startup Park Underground Parking, South Korea
Benefits | • Accurate location tracking in underground areas
• Seamless indoor-outdoor navigation
• Enhanced driver experience and parking efficiency

Drone Test Center Operations and Flight Path Accuracy



Product | uGPS™ -unit
Example | Goyang Drone Anchor Center, South Korea
Benefits | • Stable GNSS signals for accurate drone testing in drone center
• Improved safety and flight precision
• Reliable coverage in GPS-shadowed areas

IDCITI uGPS™ is ready for global deployment
— tested, proven, and optimized for environments where conventional GNSS fails.

Let's bring next-generation positioning to your operations.

Contact us today and make the impossible, possible.

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