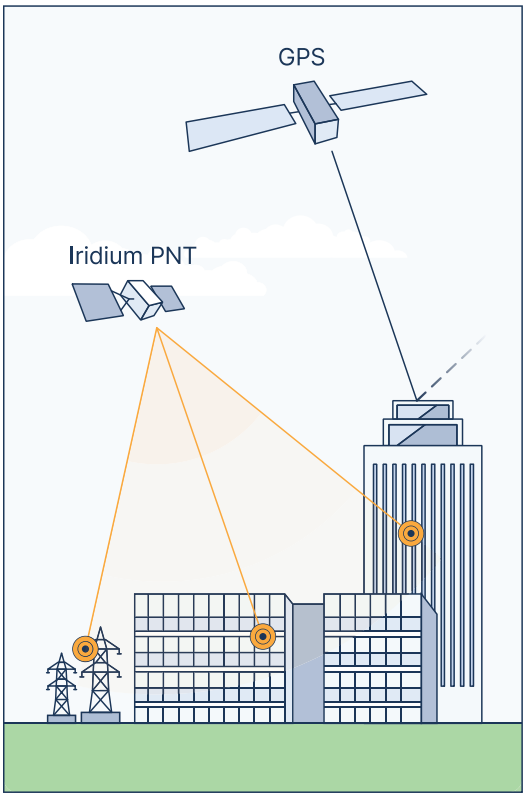
Iridium® PNT

The first truly global low-Earth orbit (LEO) positioning, navigation, and timing (PNT) solution provides resilience with exceptional reliability, high security, and signal strength greater than GPS.



NOTE: Image depicts indoor reception of Iridium PNT compared to GPS. Orbital altitudes not to scale.

Using the Iridium satellite constellation, Iridium PNT is unique among GPS/GNSS alternatives: Its signals are powerful, extremely secure, and available worldwide.

1,000x Stronger Than GPS

Iridium PNT penetrates indoors and signal-challenged urban canyons where high-rise buildings create multipath issues for GPS.

LEO Satellites

An innovative mesh architecture of 66 cross-linked LEO satellites forms a global network to provide a robust time and location service everywhere—urban and remote alike.

Trustworthy PNT Source

Complex, overlapping beam patterns combined with signal authentication techniques allow Iridium PNT to deliver trusted, secure time and location capabilities.

Telecommunications

Whether due to a deliberate attack or challenging environment, the inability to receive GPS impacts the performance of time-dependent applications like 5G, including macrocells and small cells. Iridium PNT connects to a wireless operator's RAN gear or router to provide timing sync as a resilient backup or alternative to GPS.

5G timing requirements are more stringent than 4G, and the majority of 5G sites are now located indoors where GPS often doesn't work. Iridium PNT uses a small indoor antenna to receive timing signals that penetrate most structures. This means in-building wireless installations with PNT can maintain synchronous timing without the need for an outdoor GPS antenna, which is especially important for buildings where coring through multiple floors, securing roof rights, obtaining landlord permissions, or complying with local zoning restrictions can be a challenge.

iridium®

Maritime

GPS signal interference can delay vessel departure or worse, result in accidents. Cyberattacks that spoof GPS represent another threat. Counterfeit GPS signals can be difficult to detect because they often appear genuine. When an illicit signal broadcast hijacks a legitimate GPS signal and transmits fake positioning information, ships at sea can veer off course — potentially into dangerous waters.

Iridium PNT gives mariners peace of mind by providing early warning and direct mitigation for inauthentic signals. With a powerful and fully authenticated signal resilient to spoofing or jamming, Iridium PNT helps to keep vessels safe and provides trusted location services for high-value assets.

Data Centers

Distributed databases and other aspects of data centers that require wide-area networking rely on timing to ensure efficient communication and synchronization between network nodes. Accurate time synchronization across a distributed network allows higher throughput and helps to ensure database integrity.

Financial services data centers have specialized needs for precise timing synchronization to support high-frequency trading and comply with regulatory requirements for timestamping transactions.

Other Markets

Electrical grids have interconnected their operations in recent years, creating a need much like telecom networks for time synchronization.

The transportation sector needs PNT, including rail systems with Positive Train Control (PTC) that depend on GPS to monitor train location, speed, and direction as well as prevent collisions and derailments.

An available and reliable PNT source is a necessary aspect of any company's overall cybersecurity posture, regardless of market or industry, because many information technology (IT) and operational technology (OT) systems rely on precision timing.

System Availability

- 24×7 global availability (activated regionally depending on demand)
- Due to higher signal power, availability extends to most indoor locations, sky-occluded and high-multipath environments, and locations with unintentional or intentional radio interference

Signal Power

- 30 dB stronger than GPS L1 C/A

Security

- Signal includes authentication features that make intentional misdirection exceptionally difficult for attackers

Clock Stratum Level

- Stratum 0 time source
- Supports Stratum 1 PTP Grandmaster Clock / Primary Reference Source (PRS)

UTC Traceability

- Traceable to UTC(USNO) and UTC(NIST) and continuously monitored via multiple, geographically distributed GPS tracking stations

Timing Stability

- Meets ITU-T G.8272 PRTC-A performance specifications:
  - Less than 50 nanoseconds, 1-sigma with OCXO oscillator
  - Less than 25 nanoseconds, 1-sigma with rubidium oscillator

Timing Accuracy

- Within 9 nanoseconds of UTC(NIST) after 69 days (TDEV) (Source: U.S. NIST)

Location Accuracy (Static Position)

- Horizontal (x- and y-axis): 10 meters, 1-sigma with outdoor antenna — meets FCC E911 horizontal location requirement
- Vertical (z-axis): 10 meters, 1-sigma with outdoor antenna