

SATELLITE TIME AND LOCATION

alternative to GPS/GNSS for timing sensitivalization — works with an indoor anternal and is secure from cyberattacks

STL from Satelles[®] is a resilient, alternative PNT service from low Earth orbit (LEO) satellites. Telecom operators and other companies use STL today as a primary timing source, such as for 5G deployments where GPS/GNSS is unavailable indoors. STL is the preferred choice for timing when distributed PTP networks that synchronize wireless radio access network (RAN) equipment are unable to achieve accuracies within 500 nanoseconds of UTC. Critical infrastructure owners and operators also rely on STL as an essential contingency capability to protect the operations of PNT-dependent systems and ensure survivability and resilience.

- STL is a Stratum 0 UTC source of timing that can be used to create a Stratum 1 timing clock compliant with the ITU-T G.8272 PRTC-A performance standard.
- Timing stabilities of 20-100 nanoseconds (1-sigma) are available depending on oscillator type.
- A study by the U.S. National Institute of Standards and Technology demonstrated timing accuracy of less than one nanosecond of UTC(NIST) after 25 days.
- STL timing is traceable to UTC(USNO) and UTC(NIST) via multiple, geographically distributed tracking stations.

1	Innovative Operational Characteristics	TL's high-power signals are 30 dB (1,000 times) stronger than GNSS, allowing them to penetrate eep into GNSS-challenged environments where signals are obstructed or degraded, including adoors and underground.
		environments where distributed PTP is deployed but GNSS is unavailable, STL can provide timing unchronization with a small indoor antenna — essential when outdoor GNSS antennas are impractica p install or not allowed.
A	A	TL delivers superior performance in high-multipath environments like urban canyons, where GNSS annot maintain a stable lock.
	Enhanced Security	he complex, overlapping beam patterns of the satellites combined with modern cryptographic echniques allow Satelles to deliver a trusted timing solution that is highly resistant to cyberattacks r other signal manipulation.
	Worldwide Coverage	n innovative mesh architecture of 66 cross-linked LEO satellites forms an efficient and flexible lobal network to ensure a robust service everywhere, including metropolitan areas, rural locations, ceans, and polar regions.
	Innovative and Affordable User Equipment	se of the L-band frequency allows STL to leverage GNSS chipsets that enable small receivers to perate with small antennas and at low power, thereby maximizing end-user convenience while ninimizing cost.
	Proven Technology	TL has been commercially available for more than five years and currently provides reliable PNT ervice to banks, major stock exchanges, data centers, telecom operators, and other businesses round the world.

STL for Wireless Carriers and 5G

Wireless communications networks rely on accurate timing and synchronization from GNSS signals to function properly. The inability to receive GNSS inside buildings – as well as the loss of GNSS via disruption, manipulation, or equipment failure – has been known to disable critical equipment, including macrocells and small cells.

4G/LTE networks are particularly vulnerable to timing anomalies and often have timing requirements of less than one microsecond. The timing requirements of 5G are even more stringent — plus 5G requires five to ten times the number of nodes as 4G. The majority of 5G sites are indoors where GNSS is challenged: small cells (indoors and outdoors), femtocells (enterprise and residential broadband), and picocells serving malls, hospitals, hotels, large venues, and high-rise office buildings.

Using STL, a PTP EdgeMaster can enable 5G to work deep indoors. Satelles offers standalone receivers that connect to a wireless operator's RAN gear or router to replace or augment GNSS so that STL provides timing sync whenever and wherever GNSS is unavailable.

STL offers the added advantage of utilizing a small indoor antenna to deliver timing signals that penetrate most structures, including buildings with low-emissivity (Low-E) windows or metal and concrete siding and roofing. This means that in-building wireless installations that leverage STL can maintain synchronous timing without the need for an outdoor GNSS antenna.

Having a signal that passes through structures is especially important for buildings where securing roof rights, obtaining landlord permissions, or complying with local zoning restrictions are a challenge. An indoor solution for assured PNT lowers cost and reduces the risks of installation and maintenance.

Dual-technology modules are available that are capable of receiving both STL and GNSS signals, offering operators the best of both technologies. Timing solutions based on STL also detect and mitigate GNSS signal disruption and manipulation.

Count on Assured PNT with STL

Satelles offers alternative PNT at levels of stability, reliability, and trust required by commercial enterprises and government entities. Contact us directly to learn more about how STL can support a wide range of timing synchronization applications for telecommunications and other critical infrastructure sectors.



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