Time: The Cornerstone of Secure Position, Navigation and Time (PNT)
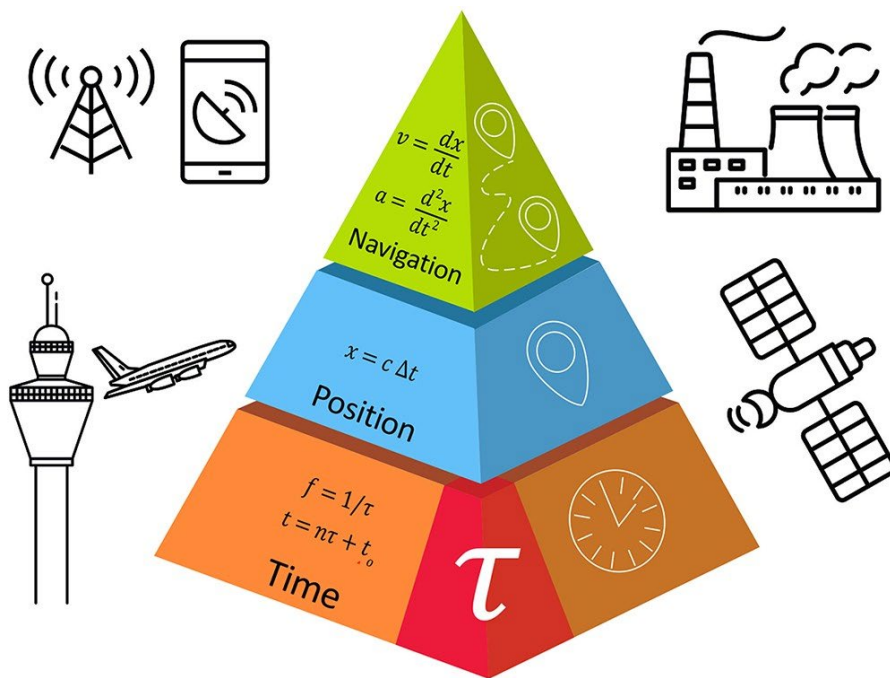
Global Navigation Satellite Systems (GNSS) have revolutionized the world. Civilian and military navigation, cellular networks, the Internet, financial services, energy distribution, and air traffic control are just a few examples of the different applications that rely heavily on GNSS.

Secure Position, Navigation and Time (PNT) solutions use a variety of methods to minimize inherent GNSS vulnerabilities. These methods include detecting threats, using multiple GNSS constellations (GPS, Galileo. GLONASS), offering alternate PNT delivery methods, and backing up PNT sources with degraded accuracy for short operational periods.
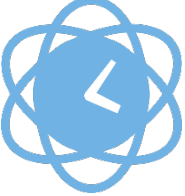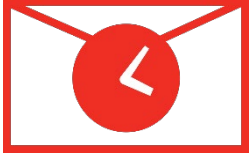
Time is the cornerstone of all secure PNT solutions. We provide innovative timing solutions for all portions of a secure PNT chain, from the PNT core to the PNT end user.

- **Time**: Atomic clocks are used at the core at the core of every PNT system to determine precise and accurate time.
- **Position**: A PNT end user's location is determined by the elapsed time microwave signals take to travel between satellites and the PNT end user
- **Navigation**: Velocity and acceleration are determined by the change in end user location over a period of time.

The Secure PNT Chain

PNT Core: Time Creation	**PNT Transmission: Time Delivery**	**PNT Resilience: Time Back Up**	**PNT Assurance: Time Defense**
Our precise and accurate system atomic clocks create the time that is at the core of every PNT system. **Recommended Products:** • 5071A Cesium Reference • MHM2020 Maser	PNT information is transmitted through space using atomic clocks and quartz oscillators as time and frequency references. Local distribution on the ground is achieved using PTP grandmasters and NTP enterprise servers. **Recommended Products:** • TimeProvider® TP4100 Server • SyncServer® S600 Server	Low Size, Weight and Power (SWaP) embedded atomic clocks, quartz oscillators and GNSS disciplined oscillators provide local time references during GNSS outages. **Recommended Products:** • CSAC SA65 • MAC SA55 • EX-421 • MD-171	BlueSky™ Firewall provides jamming and spoofing detection. M-Code receivers provide the latest military grade GPS. **Recommended Products:** • BlueSky GNSS Firewall 2200 • SyncServer® S650 Server M-code • BlueSky GNSS Firewall Software