

# **Position, Navigation, and Timing (PNT) Solution Market - A Global and Regional Analysis: Focus on Application, End User, Component, and Services - Analysis and Forecast, 2023-2033**

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## **Abstracts**

### Introduction to Global Position, Navigation, and Timing (PNT) Solution Market

The global position, navigation, and timing (PNT) solution market has experienced remarkable growth in recent years due to technological advancements and increasing demand for precise, efficient, cost-effective military capabilities. The global positioning, navigation, and timing (PNT) solution market refers to the industry providing satellite-based positioning, navigation, and timing services to various sectors such as aviation, maritime, land transportation, and defense. These services are used for navigation, surveying, mapping, timing, and synchronization applications. The market is driven by the rising adoption of GPS-enabled devices and the growing demand for location-based services. Additionally, the emergence of new applications, such as autonomous vehicles and smart cities, is expected to fuel the demand for PNT solutions further. The PNT solution market is characterized by intense competition, with several key players operating in the industry. Notable companies include Garmin Ltd., Trimble Inc., BAE Systems, Inc., NovAtel Inc., Qualcomm Technologies, Inc., and others. These companies heavily invest in research and development to introduce innovative products. The market also features smaller and medium-sized companies offering specialized products and services. With the increasing demand for PNT solutions, the market is anticipated to experience significant growth in the coming years as more industries recognize the benefits of utilizing these services. The market can be segmented based on application, end users, component, GNSS correction services by type and GNSS correction services by end users, and it is expected to witness continued growth as key players and defense forces invest in advanced technologies to enhance performance

and effectiveness, leading to new opportunities for growth and innovation in the sector.

## Market Introduction

The global position, navigation, and timing (PNT) solution market has witnessed significant growth and advancements in recent years. The widespread use of smartphones, wearable devices, and vehicle navigation systems has fueled the need for accurate positioning and navigation capabilities. PNT solutions can be integrated with other technologies to offer comprehensive solutions. For instance, the integration of PNT with artificial intelligence (AI) and machine learning (ML) enables intelligent navigation and real-time decision-making. Similarly, the fusion of PNT with sensor technologies such as LiDAR and radar enhances mapping and surveying capabilities.

Furthermore, in the field of PNT solutions, the key players are continuously working on the development of advanced algorithms, use of multi-constellation satellite systems, integration of additional sensors, and leveraging technologies such as differential GPS (DGPS) and real-time kinematic (RTK) positioning to enhance the accuracy and precision of PNT solutions.

## Industrial Impact

The global position, navigation, and timing (PNT) solution market is witnessing rapid growth due to the growing demand for GPS-enabled devices and the rising popularity of location-based services. Additionally, the emergence of advanced technologies such as autonomous vehicles, unmanned aerial vehicles (UAVs), and smart cities has further propelled the demand for PNT solutions. These solutions enable location-based services, efficient transportation systems, asset tracking, and synchronization of critical infrastructure. However, with the increased reliance on PNT solutions, cybersecurity has become a significant concern. Protecting PNT systems from spoofing, jamming, and other cyber threats is crucial. Market players are investing in developing secure PNT solutions and implementing encryption and authentication mechanisms.

## Market Segmentation:

### Segmentation 1: by Application

#### Navigation

Positioning

Precision Timing

Geo-Location

The global position, navigation, and timing (PNT) solution market is expected to generate huge revenues from the navigation application segment, followed by positioning. Navigation solutions are poised to lead the market due to the growing use of autonomous systems, such as drones and self-driving cars. They utilize satellite-based positioning technologies such as global navigation satellite systems (GNSS) to determine accurate coordinates and enable navigation in various environments. Additionally, navigation applications include personal navigation devices, vehicle navigation systems, marine navigation systems, and aviation navigation systems. Hence, to meet the demand for these systems, new navigation technologies are being developed.

Segmentation 2: by End User

Defense

Commercial

Government and Civil

The global position, navigation, and timing (PNT) solution (satellite) market is expected to be dominated by the defense in 2023, with a 40.8% share in terms of revenue due to the high demand for PNT solutions in modern military operations.

Additionally, precision-guided systems, such as guided missiles, smart bombs, and artillery systems, require highly accurate PNT data for targeting and hitting specific objectives with precision. The defense sector is investing in advanced PNT solutions to enhance the effectiveness and accuracy of such systems, resulting in increased demand.

Segmentation 3: by Component

Satellite

Ground

The global position, navigation, and timing (PNT) solution market by component includes ground, which is expected to dominate the market.

#### Segmentation 4: GNSS Correction Services by Type

Precise Point Positioning (PPP)

Real-time Kinematic (RTK)

PPP-RTK

WARTK

The global position, navigation, and timing (PNT) solution market for GNSS correction services by type includes precise point positioning (PPP), which is expected to dominate the market.

#### Segmentation 5: GNSS Correction Services by End User

Defense

Commercial

Government and Civil

#### Segmentation 6: by Region (Satellite)

North America - U.S. and Canada

Europe - U.K., France, Germany, Russia, and Rest-of-Europe

Asia-Pacific - China, India, Japan, and Rest-of-Asia-Pacific

## Rest-of-the-World - South America and Middle East, and Africa

North America is anticipated to grow at a CAGR of 11.07%. The presence of a larger number of established position, navigation, and timing (PNT) solution providers is driving the market in the region. The presence of major industry players such as Northrop Grumman, Raytheon Technologies Corporation, NovAtel, and Qualcomm Technologies, Inc. within the region with growth strategies such as partnerships are paving the way for market opportunities. Additionally, the emergence of advanced technologies, such as artificial intelligence (AI), machine learning (ML), and Internet of Things (IoT) devices, has fueled the demand for accurate and reliable PNT solutions in the region.

The U.S. dominates the global position, navigation, and timing (PNT) solution market in the region, with various key players producing PNT solutions for various applications such as navigation, positioning, precision timing, geo-location, and GNSS correction. In addition, the U.S. has expertise in various fields, including satellite navigation, geospatial technologies, and wireless communications. This technological advancement provides a solid foundation for developing and implementing advanced PNT solutions.

### Recent Developments in the Global Position, Navigation, and Timing (PNT) Solution Market

In April 2023, Orolia, a subsidiary of Safran, partnered with Xona Space Systems to integrate Xona's LEO constellation and navigation signals into its Skydel-powered simulation and testing solutions. Xona Space Systems is developing PULSAR, a PNT service that utilizes a commercial constellation of LEO satellites for high-performance positioning, navigation, and timing.

In April 2023, Qualcomm Technologies, Inc. partnered with Xiaomi to verify meter-level positioning in the Xiaomi 12T Pro smartphone powered by Snapdragon 8+ Gen 1 in Germany. This technology enhances the accuracy of location-based applications such as ridesharing, fitness, and in-vehicle navigation. It is enabled through Qualcomm Technologies, Inc.'s Meter-Level Positioning for Mobile and Trimble RTX correction services.

In March 2023, NextNav Inc. partnered with Prepared, an emergency multimedia services provider, to provide its precise location solution. NextNav Inc.'s Pinnacle

would power Prepared's z-axis location ecosystem and provide callers and responders with the most accurate data and visualization tools.

## Demand – Drivers and Limitations

### Market Demand Drivers: Growth of the Autonomous Vehicles Market

The growth of the autonomous vehicles market has driven the demand for PNT solutions. PNT technologies enable autonomous vehicles to navigate accurately, plan optimal routes, avoid collisions, and operate safely. Key market players are actively working on improving the accuracy, robustness, and resilience of PNT technologies to meet the specific requirements of autonomous vehicles.

### Market Challenges: GPS Jamming and Spoofing Attacks

Spoofing and jamming are two methods employed by adversaries to interfere with position, navigation, and time solutions obtained from GPS/GNSS. Spoofing involves manipulating a GPS receiver to generate inaccurate position calculations, while jamming occurs when local RF signals overpower GPS signals, rendering the GPS receiver unable to function properly.

### Market Opportunities: Emergence of Terrestrial-Based PNT Solutions

Terrestrial-based PNT systems are crucial in enhancing the positioning and navigation solutions of various vehicles, including unmanned aerial, ground, and maritime vehicles. They also contribute to the security of critical infrastructure, working in conjunction with GNSS technologies. In addition, the advent of sensor-based technologies has led to the development of various methods for terrestrial-based location determination and navigation. These methods rely on a range of sensor systems, including radio-frequency identification (RFID), wireless sensor networks, cellular networks, wireless local area networks (LANs), and numerous other sensor-based technologies.

How can this report add value to an organization?

**Product/Innovation Strategy:** The product segment helps the reader understand the different types of solutions available for deployment and their potential globally. Moreover, the study provides the reader with a detailed understanding of the global position, navigation, and timing (PNT) solution by component (hardware and software).

**Growth/Marketing Strategy:** The global position, navigation, and timing (PNT) solution market has seen major development by key players operating in the market, such as contract, collaboration, and joint venture. The favored strategy for the companies has been contracts to strengthen their position in the global position, navigation, and timing (PNT) solution market. For instance, in April 2023, Thales Alenia Space signed a contract with KT SAT Corporation Ltd. (KT SAT) and announced that KOREASAT 6A would include a satellite-based augmentation system (SBAS) payload. The SBAS payload would enhance the continuity and availability of the Korea Augmentation Satellite System (KASS).

**Competitive Strategy:** Key players in the global position, navigation, and timing (PNT) solution market analyzed and profiled in the study involve major global position, navigation, and timing (PNT) solution companies providing solutions, respectively. Moreover, a detailed market share analysis of the players operating in the global position, navigation, and timing (PNT) solution market has been done to help the reader understand how players stack against each other, presenting a clear market landscape. Additionally, comprehensive competitive strategies such as partnerships, agreements, and collaborations will aid the reader in understanding the untapped revenue pockets in the market.

**Methodology:** The research methodology design adopted for this specific study includes a mix of data collected from primary and secondary data sources. Both primary resources (key players, market leaders, and in-house experts) and secondary research (a host of paid and unpaid databases), along with analytical tools, are employed to build the predictive and forecast models.

Data and validation have been taken into consideration from both primary sources as well as secondary sources.

### Key Market Players and Competition Synopsis

The companies that are profiled have been selected based on thorough secondary research, which includes analyzing company coverage, product portfolio, market penetration, and insights, which are gathered from primary experts.

The top established position, navigation, and timing (PNT) solution providers hold around 79% of the presence in the market. The start-ups in the market hold around 21% of the global position, navigation, and timing (PNT) solution market.

**Key Companies Profiled:**

NextNav Inc.

BAE Systems, Inc.

Qualcomm Technologies, Inc.

NovAtel (Hexagon AB)

Raytheon Technologies Corporation

Safran

Booz Allen Hamilton Inc.

Garmin Ltd.

Northrop Grumman Corporation

Saab Ab

Telespazio S.p.A.

Thales Group

Amazon Web Services, Inc.

L3Harris Technologies, Inc.



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