

Quantum Electronics & Sensing Devices Market Forecasts to 2032 – Global Analysis By Type (Quantum Sensors and Quantum Electronics), Deployment Platform (Ground-based, Airborne, Spaceborne and Marine / Sub-surface), Enterprise Size, Technology, Application, End User and By Geography

<https://marketpublishers.com/r/QCC30ED84897EN.html>

Date: September 2025

Pages: 200

Price: US\$ 4,150.00 (Single User License)

ID: QCC30ED84897EN

Abstracts

According to Statistics MRC, the Global Quantum Electronics & Sensing Devices Market is accounted for \$436.9 billion in 2025 and is expected to reach \$1,219.9 billion by 2032 growing at a CAGR of 15.8% during the forecast period. Quantum electronics and sensing devices utilize quantum mechanical principles such as superposition, entanglement, and tunneling to achieve enhanced precision, sensitivity, and performance beyond classical systems. These technologies incorporate quantum bits, photonic circuits, and nanoscale materials to detect, measure, or manipulate physical phenomena at atomic and subatomic levels. Widely applied in metrology, biomedical diagnostics, and secure communications, they enable ultra-sensitive detection, low-noise signal processing, and real-time data acquisition, forming the foundation for next-generation instrumentation across scientific, industrial, and defense sectors.

Market Dynamics:

Driver:

Increasing need for unprecedented precision and sensitivity

Quantum electronics and sensing devices offer unmatched accuracy in detecting minute

changes in magnetic fields, gravitational forces, and time synchronization. These capabilities are vital for applications like GPS-denied navigation, subsurface mapping, and brain imaging. As conventional sensors reach their performance limits, industries are turning to quantum technologies to meet rising expectations for precision. This shift is further supported by national quantum initiatives and commercial investments aimed at enhancing strategic capabilities.

Restraint:

Competition from traditional technologies

Conventional sensors are widely available, cost-effective, and supported by mature manufacturing ecosystems. Many industries remain hesitant to adopt quantum alternatives due to high initial costs, limited scalability, and complex integration requirements. Additionally, the lack of standardized protocols and interoperability with existing systems poses challenges for widespread deployment. These factors collectively slow down the transition from legacy systems to quantum-enabled platforms.

Opportunity:

Growing convergence with AI and machine learning

Machine learning algorithms can enhance the performance of quantum sensors by compensating for noise, improving calibration, and enabling real-time decision-making. This convergence is particularly impactful in autonomous vehicles, smart infrastructure, and medical diagnostics, where rapid and accurate sensing is critical. As AI frameworks become more sophisticated, their integration with quantum devices is expected to drive innovation and open new commercial pathways. This synergy is also attracting cross-disciplinary research and venture capital funding.

Threat:

Intellectual property and national security concerns

Governments are implementing export controls and tightening regulations to safeguard sensitive quantum innovations. The dual-use nature of quantum sensors—applicable in both civilian and military domains heightens the risk of misuse or unauthorized access. Additionally, fragmented patent landscapes and overlapping claims can lead to legal

disputes, slowing down commercialization. These risks necessitate robust cybersecurity measures and international cooperation to ensure responsible development and deployment.

Covid-19 Impact:

The COVID-19 pandemic had a nuanced impact on the quantum electronics and sensing devices market. While initial lockdowns disrupted supply chains and delayed R&D activities, the crisis also underscored the importance of advanced sensing technologies in healthcare and remote diagnostics. Quantum sensors played a role in enhancing imaging precision and monitoring physiological parameters in clinical settings. Moreover, the pandemic accelerated digital transformation, prompting increased interest in quantum-enabled solutions for secure communications and data integrity.

The quantum sensors segment is expected to be the largest during the forecast period

The quantum sensors segment is expected to account for the largest market share during the forecast period due to their unparalleled ability to measure physical phenomena with extreme accuracy. Technologies such as atomic clocks, quantum magnetometers, and gravimeters are being deployed in aerospace, defense, and geophysical exploration. Their high sensitivity and resilience to environmental noise make them indispensable for strategic applications. The segment benefits from ongoing miniaturization efforts and integration with CMOS-compatible platforms, which are expanding their usability across commercial domains.

The silicon photonics segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the silicon photonics segment is predicted to witness the highest growth rate driven by its role in enabling high-speed data transmission and compact quantum circuits. These devices leverage light-based signal processing to achieve low-latency communication and enhanced bandwidth, making them ideal for quantum computing and secure networks. The segment is witnessing rapid innovation in hybrid integration techniques, allowing photonic chips to interface with quantum processors and sensors.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share attributed to robust government funding, advanced research institutions, and a thriving startup ecosystem. The region hosts several flagship quantum programs, including defense-grade sensor development and spaceborne quantum experiments. Strong collaborations between academia and industry are accelerating technology transfer and commercialization. Furthermore, regulatory support and strategic partnerships are reinforcing North America's dominance in this domain.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR fueled by rising investments in quantum research and expanding industrial applications. Countries like China, Japan, and India are launching national initiatives to build quantum infrastructure and train skilled personnel. The region's growing demand for advanced navigation systems, environmental monitoring tools, and secure communication networks is driving adoption. As regional governments prioritize technological sovereignty, Asia Pacific is emerging as a dynamic hub for quantum innovation.

Key players in the market

Some of the key players in Quantum Electronics & Sensing Devices Market include ID Quantique SA, Campbell Scientific, Inc., LI-COR Biosciences, M Squared Lasers Ltd., Muquans SAS, Qnami AG, Teledyne Scientific & Imaging, Thorlabs, Inc., Oxford Instruments plc, QuSpin Inc., Zurich Instruments AG, AOSense, Inc., Qnnect LLC, QinetiQ Group plc, Bosch Quantum Sensing, and Infleqtion.

Key Developments:

In June 2025, Campbell Scientific reported a contract to design, deliver and commission an AWOS (Automated Weather Observing System) for Beyla Airport, Guinea, showing continued deployment of their environmental/meteorological monitoring systems.

In June 2025, ID Quantique announced collaboration with Turkcell (and Juniper Networks) to deploy quantum-safe networking solutions, showcasing IDQ's quantum-secure crypto and photonics expertise for telecom infrastructure.

In January 2025, Thorlabs announced the acquisition/strategic partnership with Praevium Research (VCSEL/laser technology) a move to bring high-speed tunable

VCSEL capability into Thorlabs' portfolio. Industry coverage framed this as strengthening Thorlabs' position in quantum/photonic component supply for imaging and communications.

Types Covered:

Quantum Sensors

Quantum Electronics

Deployment Platforms Covered:

Ground-based

Airborne

Spaceborne

Marine / Sub-surface

Enterprise Sizes Covered:

Small and Medium Enterprises

Large Enterprises

Technologies Covered:

Trapped Ions

Superconducting Quantum Interference Devices (SQUIDs)

Silicon Photonics

Semiconductor Quantum Dots

Rydberg-Atom Electric-Field Sensors

Optomechanical / Photonic Sensors

Nitrogen-Vacancy (NV) Diamond

Neutral Atoms

Cold-Atom Interferometry

Other Technologies

Applications Covered:

Medical Imaging

Oil & Gas, Mining, & Geophysics

Environmental Monitoring

Quantum Computing & Cryptography

Encryption & Trading

Biomagnetic Sensing

Utilities & Energy Grid Management

Other Applications

End Users Covered:

Aerospace & Defense

Construction & Mining

Automotive & Transportation

Healthcare/Life Sciences

Research & Academia

Other End Users

Regions Covered:

North America

US

Canada

Mexico

Europe

Germany

UK

Italy

France

Spain

Rest of Europe

Asia Pacific

Japan

China

India

Australia

New Zealand

South Korea

Rest of Asia Pacific

South America

Argentina

Brazil

Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:

- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2024, 2025, 2026, 2028, and 2032
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)

- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

Contents

1 EXECUTIVE SUMMARY

2 PREFACE

- 2.1 Abstract
- 2.2 Stake Holders
- 2.3 Research Scope
- 2.4 Research Methodology
 - 2.4.1 Data Mining
 - 2.4.2 Data Analysis
 - 2.4.3 Data Validation
 - 2.4.4 Research Approach
- 2.5 Research Sources
 - 2.5.1 Primary Research Sources
 - 2.5.2 Secondary Research Sources
 - 2.5.3 Assumptions

3 MARKET TREND ANALYSIS

- 3.1 Introduction
- 3.2 Drivers
- 3.3 Restraints
- 3.4 Opportunities
- 3.5 Threats
- 3.6 Technology Analysis
- 3.7 Application Analysis
- 3.8 End User Analysis
- 3.9 Emerging Markets
- 3.10 Impact of Covid-19

4 PORTERS FIVE FORCE ANALYSIS

- 4.1 Bargaining power of suppliers
- 4.2 Bargaining power of buyers
- 4.3 Threat of substitutes
- 4.4 Threat of new entrants
- 4.5 Competitive rivalry

5 GLOBAL QUANTUM ELECTRONICS & SENSING DEVICES MARKET, BY TYPE

5.1 Introduction

5.2 Quantum Sensors

5.2.1 Single Photon Detectors (SPDs)

5.2.2 Quantum Magnetometers

5.2.3 Quantum Gravimeters & Gradiometers

5.2.4 Quantum Electrometers & RF Sensors

5.2.5 Quantum Accelerometers & Gyroscopes

5.2.6 Photosynthetically Active Radiation (PAR) Quantum Sensors

5.2.7 Other Quantum Sensors

5.2.8 Atomic Clocks

5.2.9 Other Quantum Sensors

5.3 Quantum Electronics

5.3.1 Quantum Computing Hardware

5.3.2 Quantum Communication & Cryptography Devices

5.3.3 Quantum Photonic Devices

5.3.4 Quantum Integrated Circuits

6 GLOBAL QUANTUM ELECTRONICS & SENSING DEVICES MARKET, BY DEPLOYMENT PLATFORM

6.1 Introduction

6.2 Ground-based

6.3 Airborne

6.4 Spaceborne

6.5 Marine / Sub-surface

7 GLOBAL QUANTUM ELECTRONICS & SENSING DEVICES MARKET, BY ENTERPRISE SIZE

7.1 Introduction

7.2 Small and Medium Enterprises

7.3 Large Enterprises

8 GLOBAL QUANTUM ELECTRONICS & SENSING DEVICES MARKET, BY TECHNOLOGY

- 8.1 Introduction
- 8.2 Trapped Ions
- 8.3 Superconducting Quantum Interference Devices (SQUIDs)
- 8.4 Silicon Photonics
- 8.5 Semiconductor Quantum Dots
- 8.6 Rydberg-Atom Electric-Field Sensors
- 8.7 Optomechanical / Photonic Sensors
- 8.8 Nitrogen-Vacancy (NV) Diamond
- 8.9 Neutral Atoms
- 8.10 Cold-Atom Interferometry
- 8.11 Other Technologies

9 GLOBAL QUANTUM ELECTRONICS & SENSING DEVICES MARKET, BY APPLICATION

- 9.1 Introduction
- 9.2 Medical Imaging
- 9.3 Oil & Gas, Mining, & Geophysics
- 9.4 Environmental Monitoring
- 9.5 Quantum Computing & Cryptography
- 9.6 Encryption & Trading
- 9.7 Biomagnetic Sensing
- 9.8 Utilities & Energy Grid Management
- 9.9 Other Applications

10 GLOBAL QUANTUM ELECTRONICS & SENSING DEVICES MARKET, BY END USER

- 10.1 Introduction
- 10.2 Aerospace & Defense
- 10.3 Construction & Mining
- 10.4 Automotive & Transportation
- 10.5 Healthcare/Life Sciences
- 10.6 Research & Academia
- 10.7 Other End Users

11 GLOBAL QUANTUM ELECTRONICS & SENSING DEVICES MARKET, BY GEOGRAPHY

- 11.1 Introduction
- 11.2 North America
 - 11.2.1 US
 - 11.2.2 Canada
 - 11.2.3 Mexico
- 11.3 Europe
 - 11.3.1 Germany
 - 11.3.2 UK
 - 11.3.3 Italy
 - 11.3.4 France
 - 11.3.5 Spain
 - 11.3.6 Rest of Europe
- 11.4 Asia Pacific
 - 11.4.1 Japan
 - 11.4.2 China
 - 11.4.3 India
 - 11.4.4 Australia
 - 11.4.5 New Zealand
 - 11.4.6 South Korea
 - 11.4.7 Rest of Asia Pacific
- 11.5 South America
 - 11.5.1 Argentina
 - 11.5.2 Brazil
 - 11.5.3 Chile
 - 11.5.4 Rest of South America
- 11.6 Middle East & Africa
 - 11.6.1 Saudi Arabia
 - 11.6.2 UAE
 - 11.6.3 Qatar
 - 11.6.4 South Africa
 - 11.6.5 Rest of Middle East & Africa

12 KEY DEVELOPMENTS

- 12.1 Agreements, Partnerships, Collaborations and Joint Ventures
- 12.2 Acquisitions & Mergers
- 12.3 New Product Launch
- 12.4 Expansions
- 12.5 Other Key Strategies

13 COMPANY PROFILING

- 13.1 ID Quantique SA
- 13.2 Campbell Scientific, Inc.
- 13.3 LI-COR Biosciences
- 13.4 M Squared Lasers Ltd.
- 13.5 Muquans SAS
- 13.6 Qnami AG
- 13.7 Teledyne Scientific & Imaging
- 13.8 Thorlabs, Inc.
- 13.9 Oxford Instruments plc
- 13.10 QuSpin Inc.
- 13.11 Zurich Instruments AG
- 13.12 AOSense, Inc.
- 13.13 Qnnect LLC
- 13.14 QinetiQ Group plc
- 13.15 Bosch Quantum Sensing
- 13.16 Infleqtion

List Of Tables

LIST OF TABLES

Table 1 Global Quantum Electronics & Sensing Devices Market Outlook, By Region (2024-2032) (\$MN)

Table 2 Global Quantum Electronics & Sensing Devices Market Outlook, By Type (2024-2032) (\$MN)

Table 3 Global Quantum Electronics & Sensing Devices Market Outlook, By Quantum Sensors (2024-2032) (\$MN)

Table 4 Global Quantum Electronics & Sensing Devices Market Outlook, By Single Photon Detectors (SPDs) (2024-2032) (\$MN)

Table 5 Global Quantum Electronics & Sensing Devices Market Outlook, By Quantum Magnetometers (2024-2032) (\$MN)

Table 6 Global Quantum Electronics & Sensing Devices Market Outlook, By Quantum Gravimeters & Gradiometers (2024-2032) (\$MN)

Table 7 Global Quantum Electronics & Sensing Devices Market Outlook, By Quantum Electrometers & RF Sensors (2024-2032) (\$MN)

Table 8 Global Quantum Electronics & Sensing Devices Market Outlook, By Quantum Accelerometers & Gyroscopes (2024-2032) (\$MN)

Table 9 Global Quantum Electronics & Sensing Devices Market Outlook, By Photosynthetically Active Radiation (PAR) Quantum Sensors (2024-2032) (\$MN)

Table 10 Global Quantum Electronics & Sensing Devices Market Outlook, By Other Quantum Sensors (2024-2032) (\$MN)

Table 11 Global Quantum Electronics & Sensing Devices Market Outlook, By Atomic Clocks (2024-2032) (\$MN)

Table 12 Global Quantum Electronics & Sensing Devices Market Outlook, By Other Quantum Sensors (2024-2032) (\$MN)

Table 13 Global Quantum Electronics & Sensing Devices Market Outlook, By Quantum Electronics (2024-2032) (\$MN)

Table 14 Global Quantum Electronics & Sensing Devices Market Outlook, By Quantum Computing Hardware (2024-2032) (\$MN)

Table 15 Global Quantum Electronics & Sensing Devices Market Outlook, By Quantum Communication & Cryptography Devices (2024-2032) (\$MN)

Table 16 Global Quantum Electronics & Sensing Devices Market Outlook, By Quantum Photonic Devices (2024-2032) (\$MN)

Table 17 Global Quantum Electronics & Sensing Devices Market Outlook, By Quantum Integrated Circuits (2024-2032) (\$MN)

Table 18 Global Quantum Electronics & Sensing Devices Market Outlook, By

Deployment Platform (2024-2032) (\$MN)

Table 19 Global Quantum Electronics & Sensing Devices Market Outlook, By Ground-based (2024-2032) (\$MN)

Table 20 Global Quantum Electronics & Sensing Devices Market Outlook, By Airborne (2024-2032) (\$MN)

Table 21 Global Quantum Electronics & Sensing Devices Market Outlook, By Spaceborne (2024-2032) (\$MN)

Table 22 Global Quantum Electronics & Sensing Devices Market Outlook, By Marine / Sub-surface (2024-2032) (\$MN)

Table 23 Global Quantum Electronics & Sensing Devices Market Outlook, By Enterprise Size (2024-2032) (\$MN)

Table 24 Global Quantum Electronics & Sensing Devices Market Outlook, By Small and Medium Enterprises (2024-2032) (\$MN)

Table 25 Global Quantum Electronics & Sensing Devices Market Outlook, By Large Enterprises (2024-2032) (\$MN)

Table 26 Global Quantum Electronics & Sensing Devices Market Outlook, By Technology (2024-2032) (\$MN)

Table 27 Global Quantum Electronics & Sensing Devices Market Outlook, By Trapped Ions (2024-2032) (\$MN)

Table 28 Global Quantum Electronics & Sensing Devices Market Outlook, By Superconducting Quantum Interference Devices (SQUIDs) (2024-2032) (\$MN)

Table 29 Global Quantum Electronics & Sensing Devices Market Outlook, By Silicon Photonics (2024-2032) (\$MN)

Table 30 Global Quantum Electronics & Sensing Devices Market Outlook, By Semiconductor Quantum Dots (2024-2032) (\$MN)

Table 31 Global Quantum Electronics & Sensing Devices Market Outlook, By Rydberg-Atom Electric-Field Sensors (2024-2032) (\$MN)

Table 32 Global Quantum Electronics & Sensing Devices Market Outlook, By Optomechanical / Photonic Sensors (2024-2032) (\$MN)

Table 33 Global Quantum Electronics & Sensing Devices Market Outlook, By Nitrogen-Vacancy (NV) Diamond (2024-2032) (\$MN)

Table 34 Global Quantum Electronics & Sensing Devices Market Outlook, By Neutral Atoms (2024-2032) (\$MN)

Table 35 Global Quantum Electronics & Sensing Devices Market Outlook, By Cold-Atom Interferometry (2024-2032) (\$MN)

Table 36 Global Quantum Electronics & Sensing Devices Market Outlook, By Other Technologies (2024-2032) (\$MN)

Table 37 Global Quantum Electronics & Sensing Devices Market Outlook, By Application (2024-2032) (\$MN)

Table 38 Global Quantum Electronics & Sensing Devices Market Outlook, By Medical Imaging (2024-2032) (\$MN)

Table 39 Global Quantum Electronics & Sensing Devices Market Outlook, By Oil & Gas, Mining, & Geophysics (2024-2032) (\$MN)

Table 40 Global Quantum Electronics & Sensing Devices Market Outlook, By Environmental Monitoring (2024-2032) (\$MN)

Table 41 Global Quantum Electronics & Sensing Devices Market Outlook, By Quantum Computing & Cryptography (2024-2032) (\$MN)

Table 42 Global Quantum Electronics & Sensing Devices Market Outlook, By Encryption & Trading (2024-2032) (\$MN)

Table 43 Global Quantum Electronics & Sensing Devices Market Outlook, By Biomagnetic Sensing (2024-2032) (\$MN)

Table 44 Global Quantum Electronics & Sensing Devices Market Outlook, By Utilities & Energy Grid Management (2024-2032) (\$MN)

Table 45 Global Quantum Electronics & Sensing Devices Market Outlook, By Other Applications (2024-2032) (\$MN)

Table 46 Global Quantum Electronics & Sensing Devices Market Outlook, By End User (2024-2032) (\$MN)

Table 47 Global Quantum Electronics & Sensing Devices Market Outlook, By Aerospace & Defense (2024-2032) (\$MN)

Table 48 Global Quantum Electronics & Sensing Devices Market Outlook, By Construction & Mining (2024-2032) (\$MN)

Table 49 Global Quantum Electronics & Sensing Devices Market Outlook, By Automotive & Transportation (2024-2032) (\$MN)

Table 50 Global Quantum Electronics & Sensing Devices Market Outlook, By Healthcare/Life Sciences (2024-2032) (\$MN)

Table 51 Global Quantum Electronics & Sensing Devices Market Outlook, By Research & Academia (2024-2032) (\$MN)

Table 52 Global Quantum Electronics & Sensing Devices Market Outlook, By Other End Users (2024-2032) (\$MN)

Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

I would like to order

Product name: Quantum Electronics & Sensing Devices Market Forecasts to 2032 – Global Analysis By Type (Quantum Sensors and Quantum Electronics), Deployment Platform (Ground-based, Airborne, Spaceborne and Marine / Sub-surface), Enterprise Size, Technology, Application, End User and By Geography

Product link: <https://marketpublishers.com/r/QCC30ED84897EN.html>

Price: US\$ 4,150.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/QCC30ED84897EN.html>