

## **Global Terahertz Technologies Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)**

Market Report | 2023-01-23 | 100 pages | Mordor Intelligence

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### **Report description:**

The terahertz technologies market was valued at USD 421.5 million in 2021. It is expected to reach USD 1,465.1 million by 2027, registering a CAGR of 23.22% during the forecast period (2022-2027).

### **Key Highlights**

Terahertz technology is an emerging and growing field with the potential for developing applications varying from passenger scanning at an airport to large digital data transfers. It has been reflecting significant advancements on the scientific front. Terahertz (THz) radiation exhibits three unique properties that stimulate the development of the whole terahertz industry. Terahertz (THz) frequency range (0.1 THz - 3 THz) is the last span of the electromagnetic wave spectrum, which has not been technologically and commercially developed. For this reason, in literature, the terahertz frequency range is often referred to as a terahertz gap. At the same time, it is well known that this frequency range has fascinating prospects for many applications. The application of terahertz technology in the healthcare sector is increasing, such as in biomedical imaging, terahertz imaging, and spectroscopy in cancer detection, among other applications. Further, with the ability to render high-quality spectroscopy imaging through terahertz radiation, certain chronic and related diseases have been diagnosed at ease. The replacement of conventional x-rays and infrared rays with terahertz rays has been the initial step in making huge inroads toward establishing the technology in the healthcare industry, thus driving the market growth. The growing concerns regarding security systems across many industries have created a dire need for efficient solutions that may eventually drive the market's growth. THz technology's comparative niche market potential has been primarily implemented in applications such as security imaging and non-destructive testing (NDT). Also, Terahertz technology can identify dangerous elements from a remote distance as most of the items have unique spectral identities in the terahertz range and can be easily classified by the authorities. The specialty of terahertz can be observed with the combination of spectral identification with imaging to provide a detailed description of the object and thus can be used for

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security in critical security locations.

A major challenge to adopting terahertz technology in the market has been a lack of knowledge of the technology. The research community has been making considerable inroads to exploit the potential of the technology by identifying the key positives capable of creating a separate market for itself. However, the lack of awareness of the topic, especially in developing regions, has been a major restraining factor for the market's growth.

Due to the COVID-19 outbreak, the terahertz technology market is expected to grow its healthcare, biomedical, and security applications. The outbreak has resulted in many research and development activities in the healthcare space to find appropriate technology to detect the virus, which augmented the studied market growth.

Also, COVID-19 has revolutionized security practices as screening people via personal 'patdowns' is no longer the safe option. ESA-developed passive terahertz technology enables the detection of items hidden under clothing from a distance. The technology has been commercialized by the UK company ThruVision, with customers including airports, LA Metro, and the US Customs and Border Protection (CBP) Agency at some major southern border ports of entry.

## Terahertz Technologies Market Trends

### Defense and Security is Expected to Witness Robust Market Growth

One of THz technology's core features is the ability to detect and identify objects hidden behind barriers. At airports or other security-critical places, dangerous non-metallic substances like ceramic knives or plastic explosives can now be detected with terahertz beams. This is possible because T-rays get through clothes but cannot get through the upper skin (because of the water content).

Additionally, metal detection and X-ray bag scanning are time-consuming processes; it becomes more difficult in public transportation hubs with significant movement. Hence there is a need for technological solutions that can perform security checks even at a distance from the potential source. Terahertz technology allows the scanning of a large number of people without requiring them to stop for a security check. Thereby offering a solution to these challenges.

With the increasing need for security in recent times, the ability to identify threats like hidden weapons and body-worn explosives is a strong operational need. Owing to the growing emphasis on imaging concealed explosives, terahertz technology for security and defense-related applications recently experienced an increase in interest. THz sensors' potential military applications are broad for intelligence, surveillance, and reconnaissance (ISR), including detecting isolated personnel behind enemy lines, fixing targets, and terminal guidance of precision weapons.

Further, THz can assist personnel recovery missions for downed groups or aircrew in unfortunate situations where rescue or assistance is required. In a degraded visual environment such as dust storms in the Middle East, THz's smaller wavelength and operating frequencies make it an ideal choice for tracking and finding human-sized targets of interest for recovery.

Air surveillance radar systems are another technological pairing being explored as the potential use case for THz imaging. According to some articles released by the South China Morning Post, China North Industries Group Corporation (one of the country's largest arms manufacturers) successfully tested THz instruments capable of detecting stealth aircraft.

### North America is Expected to Hold a Major Market Share

The United States is a key market for terahertz technologies, primarily due to the growing homeland security issues, investments in defense, and R&D. In addition, the stringent government regulations regarding the safety and production of aerospace technologies in the United States and the growing automotive and aerospace industries are driving the market for THz technologies in the country.

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According to the data provided by the US Department of Commerce, the US aerospace industry contributed USD 118.5 billion to the American economy in export sales. It is anticipated that for the next 20 years, the number of large commercial planes may witness 3.5% growth per year to reach 34,000 units, valued at around USD 4.5 trillion. Such heightened demand from the aircraft industry is a significant driver for the inspection systems' growth based on the terahertz technology. The increase in helicopters and commercial aircraft production in the United States is expected to drive the market. The US aerospace industry exports more than 60% of all aerospace production.

Researchers at the US Air Force are looking into technologies for future line-of-sight air-to-air communications and networking at frequencies higher than 100 GHz to help aircraft exchange mission-critical battle-management information. For the same, the Air Force experts are expected to test terahertz communication technologies through modeling and simulation.

Further, Scientists and researchers from various universities are also making significant efforts in the terahertz technologies domain. For instance, in January 2022, researchers from Harvard University made considerable improvements to bring THz frequencies out of their hard-to-reach region of the electromagnetic spectrum and into daily applications.

Canada is expected to witness significant demand for the technology due to an increase in the demand for security screening equipment across various public places. For instance, Canadian airlines screen passengers before they board flights bound for the country. Air Canada's union, i.e., the Canadian Union of Public Employees (CUPE), announced additional pre-flight screening by making flight attendants responsible for the screening.

Also, robust telecommunication networks require strong infrastructure backbones to support them. The next generation 6G network is planned to transmit data on even higher frequencies between 95GHz and 3 THz, offering speeds of up to 1 TBPS. Therefore, the market is anticipated to prosper over the coming years in the North America Region.

#### Terahertz Technologies Market Competitor Analysis

The terahertz technologies market is highly competitive and consists of several major players. In terms of market share, few of the major players currently dominate the market. These major players with prominent shares in the market are focusing on expanding their customer base across foreign countries. These companies are leveraging on strategic collaborative initiatives to increase their market shares and profitability. The companies operating in the market are also acquiring start-ups working on terahertz technologies to strengthen their product capabilities. Thus, market concentration is medium.

February 2022 - Terasense Group announced that it is upgrading its product line of fixed frequency 300GHz wave sources. A few years ago, the company announced the upgraded line of fixed frequency wave sources at 100 GHz, with the outpower options ranging from 80 mW to 1.8 W.

October 2021 - Advantest Corporation announced the acquisition of US-based R&D Altanova, Inc. Performing business in the supply of consumable test interface boards, substrates, and interconnects for high-end applications and offers simulation, design, layout, fabrication, and assembly of test interface boards which are used by testing equipment in the testing of advanced integrated circuits.

#### Additional Benefits:

The market estimate (ME) sheet in Excel format  
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