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3D Scanners - A Global Market Overview

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Abstracts

3D Scanners Market Trends and Outlook

3D Scanners are essential devices employed for digitalizing physical objects to obtain detailed shape and appearance, which can then be further employed for various applications in a number of sectors. The major technology types that these tools make use of include laser triangulation, structured light and photogrammetry that enable in creating highly accurate 3D models. 3D Scanners provide data that can be utilized for a wide range of purposes, extending from industrial design, quality control & inspection to novel applications used in the development of films, video games and virtual reality. When applied in the area of manufacturing and engineering, these devices can create exact replicas of products for reverse engineering, as also for making sure that the final product adheres to the requisite quality and design specifications. The use of 3D Scanners in preserving ancient artefacts and historical sites is also important, as they can capture and document their conditions for further restoration and maintenance. In the aerospace & defense sector, the use of these devices allows in making aircraft, vehicles and weapons with high precision by providing error-free scanning that enhances measurement accuracy and speed, forming essential constituents for developing high-tech systems.

In the field of healthcare and medicine, 3D Scanners can help create models based on the patient to plan for surgery, orthotics or prosthetics, dental & facial reconstructions and also for monitoring conditions, such as scoliosis. R&D efforts being expended to make better 3D Scanners would eventually result in highly precise and personalized healthcare solutions, such as custom implants and prosthetics.

The major types of 3D Scanners in current use include Laser 3D Scanners, Optical 3D Scanners and Structured-Light 3D Scanners, which can further be Desktop-Based, Fixed CMM-Based, Portable CMM-Based and Tripod Mounted. The range within which

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these scanners operate is categorized as Short Range (Less than 1 m), Medium Range (1.1 m to 300 m) and Long Range (Exceeding 300 m). The application areas for 3D Scanners comprise Face & Body Scanning, Quality Control & Inspection, Rapid Prototyping, Reverse Engineering and Virtual Simulation, among Others (Incl. Digital Modeling & Industrial Metrology), with the primary end-use sectors including Aerospace & Defense, Architecture & Construction, Automotive, Healthcare & Medical and Manufacturing. Other End-Use Sectors for these devices comprise Artefacts & Heritage Preservation, Energy & Power, Media & Entertainment, Mining and Robotics & Automation.

The global demand for 3D Scanners is projected to reach US$8.8 billion by 2030 from an estimated market size of US$4.9 billion in 2024 at a robust CAGR of 10.2% between 2024 and 2030.

Some of the primary factors driving the demand for 3D Scanners include wider adoption of portable & handheld scanners, integration of artificial intelligence (AI) & machine learning (ML), evolution of LiDAR scanners, support offered to multi-modality in scanning, use of cloud-based data processing & collaboration, augmented reality (AR) integration and the need to make these devices affordable & accessible to a wider user base. Owing to the nature of the beast, this technology will continue to develop over the coming period to further provide innovative solutions that can ease lacunae in various sectors. For example, product lifecycle management (PLM) is a crucial industrial process that entails the stages of concept, design, manufacturing and servicing. At this juncture, 3D Scanners can be utilized for establishing the various requirements and specifications, leading to concept designs and prototypes. In the design stage, a 3D Scanner can be employed for rapid prototyping, computer-aided design (CAD), testing, simulation and analysis. The tool can be further made use of in assembling & manufacturing, followed by quality control at the production stage. Any product's process of life cycle management would be incomplete without documentation, maintenance, repair, replacement, reuse and restoration during the servicing phase, which are adequately accomplished using 3D Scanners.

While these devices have several very evident benefits in terms of advanced technology and applications, wider adoption of 3D Scanners still faces certain roadblocks. These include high initial investment cost to procure equipment and lack of adequately trained personnel to manage these tools. The latter drawback becomes more apparent in instances where 3D scanning systems are integrated with other solutions for improving their functionality, thereby needing the technical proficiency of experts to operate the same. Further, small- and medium-scale enterprises generally shy away from acquiring

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and using advanced technological solutions due to budgetary constraints, for which it is imperative that 3D Scanners be affordable and practicable for all types of operations. Accuracy and performance of 3D Scanners can be ensured only by regular proper calibration and maintenance, which can be expensive and take time to achieve, thereby limiting the scope of potential users. Lack of awareness about this technology, despite its quite widespread penetration, and issues related to compatibility when integrated with multiple systems are further hindrances for the demand for 3D Scanners.

3D Scanners Regional Market Analysis

By region, North America represents the largest global market for 3D Scanners, since some the leading end-users of these devices in the areas of aerospace & defense, automotive, healthcare and manufacturing are well-established in the region. As 3D Scanning is vital to their ongoing efforts aimed at designing and developing novel parts and components, the demand for the same would maintain impressive growth in the region. On the other hand, the fastest upsurge in the market for these scanners is likely to be posted by Asia-Pacific. China and India have emerged as global hubs for a wide range of manufacturing sectors, with the former now outpacing even the United States as the number one automobile manufacturer. Japan and South Korea, too, have well-entrenched industrial establishments in various areas that employ these scanners for operational efficiency. Further, the need for quality building infrastructure in Asia-Pacific, be it for residential, commercial or industrial purposes, will further propel the market for 3D Scanners.

3D Scanners Market Analysis by Scanner Type

Laser, Optical and Structured Light are the most widely used types of 3D Scanners, among which the worldwide market for Laser 3D Scanners leads the market. The major reasons for this include the ability of these scanners to capture detailed geometries, even of surfaces having shiny or dark finishes, low sensitivity to ambient light conditions & changing light and their availability in compact, handheld formats. However, the global demand for Structured Light 3D Scanners is likely to register the fastest growth, since these devices are much more affordable owing to technological developments. This factor of economy has further influenced the wider use of Structured Light 3D Scanners among small and medium scale producers.

3D Scanners Market Analysis by Installation Type

3D scanners based on installation method can further be classified as Desktop-Based,

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Fixed CMM-Based, Portable CMM-Based and Tripod Mounted, within which the latter is expected to account for the largest share of the market. Being mounted on tripods allows these scanners to capture extremely accurate data of large items and surroundings with minimal movements and vibrations, thereby ensuring that the acquired data is reliable and consistent. Large amounts of data can be captured using tripod-mounted 3D Scanners that results in reducing the time required for project completion. Several manufacturers, having recognized the significance of the same, have introduced novel products that are further boosting demand.

As far as growth is concerned, the global demand for Portable CMM-Based 3D Scanners will likely clock the fastest CAGR during the analysis period because of a number of factors. These comprise greater adaptability & multifunctionality compared to their fixed CMM-based counterparts, capability of recording variously-sized & shaped objects in three dimensions, provision of detailed inspection reports & automatic data recording and accomplishing the need for high-precision measurements. Consequent to these benefits, the use of Portable CMM-Based 3D Scanners is widespread in quality control & inspection, tool verification and production of medical devices, such as prosthetics, implants & surgical tools.

3D Scanners Market Analysis by Range

3D Scanners can also be classified based on the range within which they operate, including Short Range (Less than 1 m), Medium Range (1.1 m to 300 m) and Long Range (Exceeding 300 m). With an estimated share of nearly 50% in 2024, Short Range 3D Scanners dominate the overall global market for these devices, since they are economical, compact and easy to use for a range of applications, such as product design and material inspection. These scanners also offer safety when used on people or animals. The demand for Medium Range 3D Scanners, though, is poised to witness the fastest growth over the 2024-2030 analysis period, as the use of time-of-flight (ToF) scanning further augments its precision. The applications of these scanners in the architecture and construction industry range from design to maintenance activities of buildings or process plants. Handheld medium-range 3D scanners can offer an entire 3D view and documentation of a prospective or ongoing construction site. Other than this, these scanners also find application in artifact & cultural heritage preservation, forensics and entertainment.

3D Scanners Market Analysis by Application

With an estimated 2024 global market share of over 34%, Quality Control & Inspection

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forms the leading application for 3D Scanners. This aspect is crucial for virtually all parts and components manufactured to ensure that the final product's specifications match precisely with input data when inspected. The process of Quality Control & Inspection is highly important in the areas of automotive, aerospace and electronics, since even minor glitches in component fabrication, such as surface defects and assembly non-conformity, can lead to considerable losses. Hence, it becomes important to ascertain that the product made is up to standard, so that high quality and economical production costs are maintained. The market for 3D Scanners as used for Virtual Simulation applications will likely register the fastest growth because both technologies have an ideal synergistic compatibility with one another. In combination, these technologies can help expedite the design process by permitting virtual testing and modifications. In the construction sector, building information management (BIM) employs a digital process used by civil engineers for creating a virtual model of a project and managing its lifecycle, which can be accomplished using 3D Scanners. Further applications include using these devices to scan and capture images of existing buildings into virtual models that can assist in renovating them. The use of Virtual Simulation has grown appreciably across a range of industries, since this resourceful tool can reduce or even eliminate the need for physical prototypes and testing, due to which time and resources can be saved and diverted to other critical areas. Rapid Prototyping is another application for 3D Scanners that is expected to post an impressive growth during the analysis period by virtue of being closely associated with almost all the sectors where these solutions are used.

3D Scanners Market Analysis by End-Use Sector

Worldwide, the Automotive sectors is anticipated to be the largest end-user of 3D Scanners, wherein they are utilized for designing, material processing and quality control & inspection applications. Although this set of processes is practically comparable across nearly every industrial sector, the sheer volume of automobiles being manufactured and sold leads to wider adoption of 3D Scanners to maintain product and component integrity. Fastest growth in the market for 3D Scanning, however, is expected from the Healthcare & Medical sector, where the use of this technology helps in several ways. For instance, 3D Scanners can be utilized to develop a digital version of human anatomical cross-section for improving diagnosis, treatment and precision in the final outcome. Optical 3D Scanners form a vital tool in radiology owing to minimal radiation exposure for patients in diagnosing several diseases. These scanners are also highly efficient in creating detailed models for personalized prosthetic development, as also for medical imaging, patient monitoring and surgical planning, among others.

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3D Scanners Market Report Scope

This global report on 3D Scanners analyzes the market based on scanner type, installation type, range, application and end-use sector for regional and country markets from 2021 to 2030 in terms of market value in US$. In addition to providing profiles of major companies operating in this space, the latest corporate and industrial developments have been covered to offer a clear panorama of how and where the market is progressing.

Key Metrics

Historical Period: 2021-2023

Base Year: 2024

Forecast Period: 2024-2030

Units: Value market in US$

Companies Mentioned: 40+

3D Scanners Market by Geographic Region

- North America (The United States, Canada and Mexico)
- Europe (France, Germany, Italy, Russia, Spain, The United Kingdom and Rest of Europe)
- Asia-Pacific (China, Japan, India, South Korea and Rest of Asia-Pacific)
- South America (Argentina, Brazil and Rest of South America)
- Middle East & Africa

3D Scanners Market by Scanner Type

- Laser 3D Scanners

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- Optical 3D Scanners
- Structured-Light 3D Scanners

3D Scanners Market by Installation Type

- Desktop-Based
- Fixed CMM-Based
- Portable CMM-Based
- Tripod Mounted

3D Scanners Market by Range

- Short Range
- Medium Range
- Long Range

3D Scanners Market by Application

- Face & Body Scanning
- Quality Control & Inspection
- Rapid Prototyping
- Reverse Engineering
- Virtual Simulation
- Other Applications (Incl. Digital Modeling, Industrial 3D Metrology)

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3D Scanners Market by End-Use Sector

Aerospace & Defense

Architecture & Construction

Automotive

Healthcare & Medical

Manufacturing

Other End-Use Sectors (Include Artefacts & Heritage Preservation, Energy & Power, Media & Entertainment, Mining and Robotics & Automation)

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Contents

PART A: GLOBAL MARKET PERSPECTIVE

1. Introduction
Scanner Type Outline
3D Scanners Defined
3D Scanners Market by Type
Laser 3D Scanners
Optical 3D Scanners
Structured-Light 3D Scanners
3D Scanners Market by Product Type
Desktop-Based
Fixed CMM-Based
Portable CMM-Based
Tripod Mounted
3D Scanners Market By Range
Short Range
Medium Range
Long Range
3D Scanners Market By Application
Face & Body Scanning
Quality & Control Inspection
Rapid Prototyping
Reverse Engineering
Virtual Simulation
Other Applications (Incl. Digital Modeling & Industrial Metrology)
3D Scanners Market By End-Use Sector
Aerospace & Defense
Architecture & Construction
Automotive
Healthcare & Medical
Manufacturing
Other End-Use Sectors (Include Artefacts & Heritage Preservation, Energy & Power, Media & Entertainment, Mining and Robotics & Automation)
2. Key Market Trends
3. Key Market Players
3D Digital Corp
3D Systems Corp

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Artec 3D
Artec Europe, S.a.r.l (Artec 3D)
Autodesk Inc.
Automated Precision, Inc (API)
Basis Software, Inc. - Surphaser
Carl Zeiss AG
Carl Zeiss Optotechnik GmbH
Creaform Inc. (AMETEK)
CyberOptics Corp
David Vision Systems GmbH
Direct Dimensions, Inc.
Evatronix SA
Exact Metrology by In-Place Machining Company LLC
Faro® Technologies, Inc.
Fuel3D Technologies Limited
GOM GmbH
Hexagon AB
Jenoptik AG
Keyence Corp
Konica Minolta, Inc.
Kreon Technologies
Leica Geosystems AG
Maptek Pty. Ltd.
Mitutoyo Corp
NeoMetrix Technologies, Inc.
Nextengine, Inc.
Nikon Corp
Nikon Metrology NV
OGI System Ltd
Perceptron Inc.
Polyga, Inc.
Renishaw plc
Revopoint 3D Technologies, Inc.
Riegl Laser Measurement Systems GmbH
Scantech (Hangzhou) Co Ltd
ShapeGrabber, Inc.
Shining 3D Tech Co Ltd
Solutionix Corp
Surphaser

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THOR3D
Topcon Corporation
Trimble Navigation Ltd
Trimble, Inc.
4. Key Business & Offering Trends
5. Global Market Overview
Global 3D Scanners Market Overview by Scanner Type
3D Scanners Type Market Overview by Global Region
Laser 3D Scanners
Optical 3D Scanners
Structured-Light 3D Scanners
Global 3D Scanners Market Overview by Product Type
Desktop-Based
Fixed CMM-Based
Portable CMM-Based
Tripod Mounted
Global 3D Scanners Market Overview by Range
Short Range
Medium Range
Long Range
Global 3D Scanners Market Overview by Application
Face & Body Scanning
Quality Control & Inspection
Rapid Prototyping
Reverse Engineering
Virtual Simulation
Other Applications (Incl. Digital Modeling & Industrial Metrology)
Global 3D Scanners Market Overview by End-Use Sector
Aerospace & Defense
Architecture & Construction
Automotive
Healthcare & Medical
Manufacturing
Other End-Use Sectors (Incl. Artefacts & Heritage Preservation, Energy & Power, Media & Entertainment, Mining and Robotics & Automation)

PART B: REGIONAL MARKET PERSPECTIVE

Global 3D Scanners Market Overview by Geographic Region

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REGIONAL MARKET OVERVIEW
6. North America
North American 3D Scanners Market Overview by Geographic Region
North American 3D Scanners Market Overview by Scanner Type
North American 3D Scanners Market Overview by Product Type
North American 3D Scanners Market Overview by Range
North American 3D Scanners Market Overview by Application
North American 3D Scanners Market Overview by End-Use Sector
Country-wise Analysis of North American 3D Scanners Market
The United States
United States' 3D Scanners Market Overview by Scanner Type
United States' 3D Scanners Market Overview by Product Type
United States' 3D Scanners Market Overview by Range
United States' 3D Scanners Market Overview by Application
United States' 3D Scanners Market Overview by End-Use Sector
Canada
Canadian 3D Scanners Market Overview by Scanner Type
Canadian 3D Scanners Market Overview by Product Type
Canadian 3D Scanners Market Overview by Range
Canadian 3D Scanners Market Overview by Application
Canadian 3D Scanners Market Overview by End-Use Sector
Mexico
Mexican 3D Scanners Market Overview by Scanner Type
Mexican 3D Scanners Market Overview by Product Type
Mexican 3D Scanners Market Overview by Range
Mexican 3D Scanners Market Overview by Application
Mexican 3D Scanners Market Overview by End-Use Sector
7. Europe
European 3D Scanners Market Overview by Geographic Region
European 3D Scanners Market Overview by Scanner Type
European 3D Scanners Market Overview by Product Type
European 3D Scanners Market Overview by Range
European 3D Scanners Market Overview by Application
European 3D Scanners Market Overview by End-Use Sector
Country-wise Analysis of European 3D Scanners Market
France
French 3D Scanners Market Overview by Scanner Type
French 3D Scanners Market Overview by Product Type
French 3D Scanners Market Overview by Range

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French 3D Scanners Market Overview by Application
French 3D Scanners Market Overview by End-Use Sector
Germany
German 3D Scanners Market Overview by Scanner Type
German 3D Scanners Market Overview by Product Type
German 3D Scanners Market Overview by Range
German 3D Scanners Market Overview by Application
German 3D Scanners Market Overview by End-Use Sector
Italy
Italian 3D Scanners Market Overview by Scanner Type
Italian 3D Scanners Market Overview by Product Type
Italian 3D Scanners Market Overview by Range
Italian 3D Scanners Market Overview by Application
Italian 3D Scanners Market Overview by End-Use Sector
Russia
Russian 3D Scanners Market Overview by Scanner Type
Russian 3D Scanners Market Overview by Product Type
Russian 3D Scanners Market Overview by Range
Russian 3D Scanners Market Overview by Application
Russian 3D Scanners Market Overview by End-Use Sector
Spain
Spanish 3D Scanners Market Overview by Scanner Type
Spanish 3D Scanners Market Overview by Product Type
Spanish 3D Scanners Market Overview by Range
Spanish 3D Scanners Market Overview by Application
Spanish 3D Scanners Market Overview by End-Use Sector
The United Kingdom
United Kingdom 3D Scanners Market Overview by Scanner Type
United Kingdom 3D Scanners Market Overview by Product Type
United Kingdom 3D Scanners Market Overview by Range
United Kingdom 3D Scanners Market Overview by Application
United Kingdom 3D Scanners Market Overview by End-Use Sector
Rest of Europe
Rest of Europe 3D Scanners Market Overview by Scanner Type
Rest of Europe 3D Scanners Market Overview by Product Type
Rest of Europe 3D Scanners Market Overview by Range
Rest of Europe 3D Scanners Market Overview by Application
Rest of Europe 3D Scanners Market Overview by End-Use Sector
8. Asia-Pacific

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Asia-Pacific 3D Scanners Market Overview by Geographic Region
Asia-Pacific 3D Scanners Market Overview by Scanner Type
Asia-Pacific 3D Scanners Market Overview by Product Type
Asia-Pacific 3D Scanners Market Overview by Range
Asia-Pacific 3D Scanners Market Overview by Application
Asia-Pacific 3D Scanners Market Overview by End-Use Sector
Country-wise Analysis of Asia-Pacific 3D Scanners Market
China
Chinese 3D Scanners Market Overview by Scanner Type
Chinese 3D Scanners Market Overview by Product Type
Chinese 3D Scanners Market Overview by Range
Chinese 3D Scanners Market Overview by Application
Chinese 3D Scanners Market Overview by End-Use Sector
India
Indian 3D Scanners Market Overview by Scanner Type
Indian 3D Scanners Market Overview by Product Type
Indian 3D Scanners Market Overview by Range
Indian 3D Scanners Market Overview by Application
Indian 3D Scanners Market Overview by End-Use Sector
Japan
Japanese 3D Scanners Market Overview by Scanner Type
Japanese 3D Scanners Market Overview by Product Type
Japanese 3D Scanners Market Overview by Range
Japanese 3D Scanners Market Overview by Application
Japanese 3D Scanners Market Overview by End-Use Sector
South Korea
South Korean 3D Scanners Market Overview by Scanner Type
South Korean 3D Scanners Market Overview by Product Type
South Korean 3D Scanners Market Overview by Range
South Korean 3D Scanners Market Overview by Application
South Korean 3D Scanners Market Overview by End-Use Sector
Rest of Asia-Pacific
Rest of Asia-Pacific 3D Scanners Market Overview by Scanner Type
Rest of Asia-Pacific 3D Scanners Market Overview by Product Type
Rest of Asia-Pacific 3D Scanners Market Overview by Range
Rest of Asia-Pacific 3D Scanners Market Overview by Application
Rest of Asia-Pacific 3D Scanners Market Overview by End-Use Sector
9. South America
South American 3D Scanners Market Overview by Geographic Region

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South American 3D Scanners Market Overview by Scanner Type
South American 3D Scanners Market Overview by Product Type
South American 3D Scanners Market Overview by Range
South American 3D Scanners Market Overview by Application
South American 3D Scanners Market Overview by End-Use Sector
Country-wise Analysis of South American 3D Scanners Market
Argentina
Argentine 3D Scanners Market Overview by Scanner Type
Argentine 3D Scanners Market Overview by Product Type
Argentine 3D Scanners Market Overview by Range
Argentine 3D Scanners Market Overview by Application
Argentine 3D Scanners Market Overview by End-Use Sector
Brazil
Brazilian 3D Scanners Market Overview by Scanner Type
Brazilian 3D Scanners Market Overview by Product Type
Brazilian 3D Scanners Market Overview by Range
Brazilian 3D Scanners Market Overview by Application
Brazilian 3D Scanners Market Overview by End-Use Sector
Rest of South America
Rest of South American 3D Scanners Market Overview by Scanner Type
Rest of South American 3D Scanners Market Overview by Product Type
Rest of South American 3D Scanners Market Overview by Range
Rest of South American 3D Scanners Market Overview by Application
Rest of South American 3D Scanners Market Overview by End-Use Sector
10. Middle East & Africa
Middle East & Africa 3D Scanners Market Overview by Scanner Type
Middle East & Africa 3D Scanners Market Overview by Product Type
Middle East & Africa 3D Scanners Market Overview by Range
Middle East & Africa 3D Scanners Market Overview by Application
Middle East & Africa 3D Scanners Market Overview by End-Use Sector

PART C: GUIDE TO THE INDUSTRY

PART D: ANNEXURE

1. RESEARCH METHODOLOGY
2. FEEDBACK

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