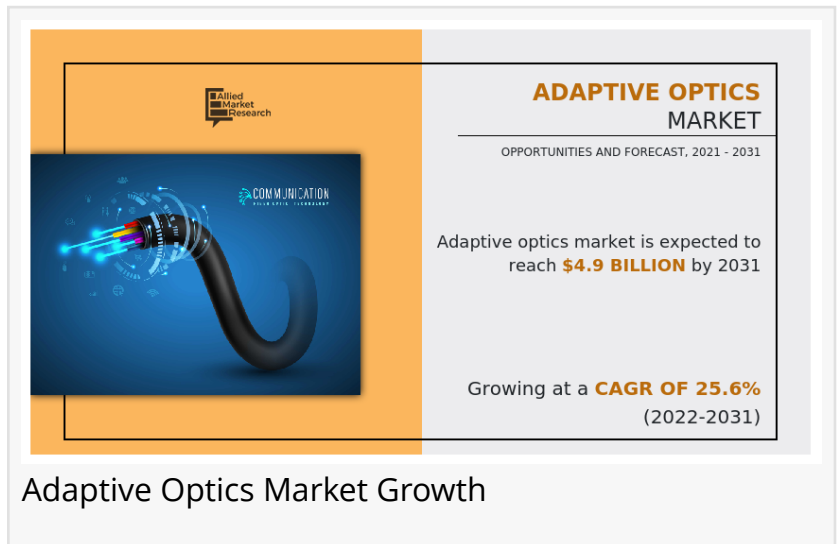


Adaptive Optics Market Growth: A Deep Dive into the \$4.9 Billion Forecast 2031 | Allied Market Research

Adaptive optics (AO) is a branch of optics and photonics integrated with optical systems for beam propagation, communications, and microscopy.

WILMINGTON, NEW CASTLE, DE, UNITED STATES, December 12, 2024 /EINPresswire.com/ -- Allied Market Research recently published a report, titled, "[Adaptive Optics Market](#) by Component (Wavefront Sensor, Wavefront Modulator, Control System), by Industry Vertical (Astronomy, Biomedical, Military & Defense, Industrial & Manufacturing, Others), by Application (Ophthalmology, Microscopy, Laser Application, Others): Global Opportunity Analysis and Industry Forecast, 2021-2031." As per the report, the global adaptive optics industry was estimated at \$494.5 million in 2021, and is set to reach \$4.9 billion by 2031, growing at a CAGR of 25.6% from 2022 to 2031. The report offers a detailed analysis of changing market trends, top segments, key investment pockets, value chains, regional landscapes, and competitive scenarios.



Adaptive Optics Market Growth

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The factors such as adoption in the field of astronomy, growth in prevalence of retinal degeneration diseases, and rise in demand for high-resolution microscopy in various biomedical research operations supplement the growth of the adaptive optics market. However, high initial cost of adaptive systems and complex design & optimization of space optical solutions are the factors expected to hamper the growth of the adaptive optics market. In addition, increase in demand for photonics enabled products to enhance system efficiency to aid growth and rise in R&D investments in advanced optics technology create market opportunities for the key players operating in the adaptive optics market.

The concept of adaptive optics is typically attributed to the optical systems that adapt to rectify

optical effects that is caused by the medium between the object and its image. Adaptive optics leads to significantly sharper images by means of compensating for these optical effects. The requirements for an adaptive optics system include deformable mirrors, precision optics, special sensors, and high-speed computers. The high-speed computers are used to combine and control the entire system. Currently, the adaptive optics alongside Optical Coherence Tomography (OCT) is slowly penetrating the market because of its viability in giving enhanced and high-speed imaging. Advanced deformable mirrors are being created to exactly control the incident wavefront by reshaping a reflecting membrane with the assistance of precise magnetic actuators. For instance, in March 2022, Edmund Optics Inc. partnered with UltraFast Innovations GmbH, a cutting-edge manufacturer of complex laser optics components, to offer UFI's Extreme Ultraviolet (EUV) Attosecond Multilayer Mirrors, which allow extremely high precision in terms of wavelength/energy, spectral phase, and high efficiency for quickly repairing broken systems.

In addition, the [adaptive optics market has witnessed significant growth](#) in recent years, owing to an increase in demand for high-resolution microscopy in various biomedical research operations and growing usage of adaptive optics for clinical application and research. Furthermore, the companies operating in the adaptive optics market have adopted partnerships, investments, and product developments to increase their market share and expand their geographical presence. For instance, in March 2022, Benchmark Electronics, Inc. announced investment in new optical integration, photonics packaging, and photonics test capabilities at its RF and Photonics Center of Innovation in Phoenix. This allowed Benchmark to improve its offerings in providing advanced optical capabilities for applications such as high-speed digital communications, high performance computing, sensors, and laser systems. Similarly, in August, 2021, Benchmark Electronics, Inc. announced partnership with Aeye Inc., manufacturer of vision hardware, software, and algorithms for autonomous vehicles, to manufacture optical components and modules in Aeye's sensors. Benchmark also worked to reduce the size of the optics and ruggedize the LiDAR solutions through its hermetic sealing processes

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Based on the type, the wavefront sensor segment contributed to the highest market share in 2021, accounting for nearly two-fifths of the global adaptive optics market share. However, the wavefront modulator segment is predicted to contribute majorly toward an overall market share in 2031, contributing more than one-third of the global market share. Furthermore, this segment is also likely to register the highest CAGR of nearly 27.0 % during the forecast timeline. The growth of the wavefront modulator segment over the forecast period can be attributed to the wide application of wavefront modulators in optical information processing systems. The report also includes other segments such as the control system.

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On basis of the industry vertical, the military & defense segment contributed to the highest

market share in 2021, accounting for more than one-third of the global adaptive optics market share. Reportedly, this segment is predicted to contribute majorly toward an overall market share in 2031. The segmental growth over the forecast timeline can be attributed to the extensive application of adaptive optics in the military & defense sector as the adaptive optics to improve the performance of laser-based weapon systems. The report also analyzes other segments such as astronomy, biomedical, industrial & manufacturing, and others segments.

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In terms of the application, the microscopy segment contributed to the highest market share in 2021, accounting for nearly one-third of the global adaptive optics market share. Reportedly, this segment is predicted to contribute majorly toward an overall market share in 2031. The expansion of this segment over the forecast timeline is owing to large-scale use of adaptive optics in high-resolution microscopy. The report also includes other segments such as Ophthalmology, Laser Application, and Others.

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By Region, North America contributed notably toward an overall market share in 2021, and is projected to continue its dominance during the forecast period. The region accounted for more than two-fifths of the global adaptive optics market share in 2021. The region is projected to dominate the global market even in 2031. The growth of the market in the region over the forecast timespan can be credited to the increased presence of numerous companies operating across North America. In addition, the key players operating across the industry in North America are offering advanced adaptive optics systems to be used across defense, astronomy, medical, manufacturing, and other industries. However, the Asia-Pacific region is anticipated to record the fastest CAGR of 29.0% from 2022 to 2031. The growth of the regional market over the forecast period can be attributed to the approval of adaptive optics devices in countries such as China, Japan, India, and South Korea. Furthermore, [increasing acceptance of adaptive optics for retinal imaging is anticipated](#) to fuel the adaptive optics market in this region. The report also analyzes other segments including LAMEA and Europe.

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Baker Adaptive Optics
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Boston Micromachines Corporation
Edmund Optics Inc.
Electro Optic Systems Pty Ltd.
Flexible Optical B.V.
Imagine Optic
Iris AO, Inc.
Northrop Grumman Corporation
Phasics SA
Synopsys, Inc.
Teledyne e2v
Thorlabs, Inc.

The report analyzes these key players in the global adaptive optics market. These players have implemented key business strategies such as strategic expansion, new product launches, alliances, and joint ventures for enhancing market penetration and reinforcing their position in the industry. The report helps the target audience in determining the market performance, performance of each segment, product portfolio development in the market, and contributions made by each player to the market expansion.

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By component, the wavefront modulator segment dominated the global adaptive optics market in terms of growth rate.
By industry vertical, the others segment dominated the global adaptive optics market in terms of growth rate.
By application, the others segment dominated the global adaptive optics market in terms of growth rate.

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