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Deep Space Robotics Market By Solution (Remotely Operated Vehicles, Remote Manipulator System, Software, Services), By Application (Space Exploration, Satellite Servicing, Space Infrastructure Assembly), By End User (Government, Commercial): Global Opportunity Analysis and Industry Forecast, 2024-2033

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Abstracts

Deep space robotics represents a field of engineering and science that helps the people and astronauts in space exploration and mission activities. It is widely used in satellite maintenance, assembling, satellite servicing and gathering constraints in exceptionally tough environments in space. It utilizes space robotics to accelerate schedules and minimize the costs which leads to incur minimal risks and improve overall performance. Space robots increase the ability of humans to work in space by offering greater handling capabilities to astronauts. As a result, space robotics finds massive application in freely operating on any planetary surface.

Rise in demand for on orbit assembly, increase in servicing of satellite across the globe, huge investments in the space exploration activities by several countries, and debris removal are among the major factors boosting the demand for space robotics. The pioneering deployment of space robots in near space, deep space, and ground from government and commercial sectors is expected to boost the growth rate in the forecast period.

Factors such as increase in investments for space robotics across the globe, rising demand for satellite launches, and rising joint ventures by key players to expand business and geographic reach are the major drivers for space robotics market.

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Moreover, the factors such as excessive costs involved in space robotics and space exploration missions and increasing space debris to hamper space robotics in the coming years restrain the growth of space robotics market.

Space robots are important tools for space explorations. These are fully or semi-autonomous devices that are created to move around the surfaces of planets or other planetary bodies to gather information regarding the terrain or to collect samples such as liquids, dust, rocks, and soil. Many regions across the world have invested in space exploration programs to detect presence of valuable elements, water, and similar materials on planets.

The governments in big nations such as the U.S., Russia, China, Japan, and France have financed their space projects worth thousands of millions in recent past. For instance, NASA launched its Mars 2020 mission on July 30, 2020, which included the use of Perseverance rover and several robotic arms. Moreover, China launched Tianwen-1 on July 23, 2020, which consists of a rover, a lander, and an orbiter. Both these projects are worth millions of dollars. These space robots would help in identification of minerals and detecting life on Mars, possibilities for preservation of biosignatures within available geological resources, and different kinds of rocks on the surface of Mars.

In addition, various regions across the globe have intended to implement space missions involving rovers in the coming years. For instance, Japan Aerospace Exploration Agency (JAXA) is planning to launch the Martian Moons Exploration mission to explore two moons of Mars by 2024. It would include a space robot that is being developed by JAXA in partnership with teams at French space agency CNES and German space agency DLR. Moreover, the Indian Space Research Organization (ISRO) is expected to launch Chandrayaan-3, Lunar Polar Exploration Mission, and Mangalyaan 2 mission in the future. The growth in investments in space missions involving launch of rovers and new space robots to analyze terrain and study characteristics of rocks and soil is expected to propel the growth of global space robotics market during the forecast period.

However, the artificial (human-made) orbital debris and natural meteoroids are integrated in space debris. The meteoroids orbit the sun, while most human-made debris orbit the Earth. Any artificial type of item in orbit around the Earth that no spongy implements a valuable role is called orbital trash. The fragmentation debris, abandoned launch vehicle stages, mission-related junk, and nonfunctional spacecraft is a type of debris. As per the NASA report, there are more than 27,000 pieces of space debris.

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These debris are much bigger in size than softball orbiting the Earth. They usually move at speeds up to 17,500 mph. The speed is fast enough for a small piece of orbital debris to damage a space robot or a spacecraft or satellite. The increasing population of space debris enhances the possible danger to all space vehicles, including the International Space Station and other spacecraft.

The excessive cost in developing space robots and other space products has always been a main obstacle to the development of the space industry. Owing to advancement in technologies such as the miniaturization of payloads and satellites, space robot manufacturers seek to leverage cost reduction while executing key functions in the value chain. The companies around the world are also producing high-quality and low-cost space robots due to growth in competition. The developments in technology enable companies to design new type of space robots while maintaining the affordability of the product.

Newly developed space robots are energy-effective that are intended to provide specific applications. Furthermore, manufacturing companies around the world are implementing energy-efficient space robots to assist in playing critical tasks in space without any interruption.

The defense companies across the globe are also looking for less expensive multifunctional space robots. Force sensing is another technology that is having a major opportunity for the space industry. Such technologies have made pick-and-place activities much cheaper and easier, hence driving the growth of the space robotics market.

The key space agencies, such as Centre National d'Etudes Spatiales (CNES) (France), German Aerospace Center (DLR), European Space Agency (ESA), China National Space Administration (CNSA), National Aeronautics and Space Administration (NASA), Russian Federal Space Agency (Roscosmos), and other space agencies, have demarcated a set of governing norms to control space debris by removal and monitoring process. Though, most of the norms are limited to the monitoring portion of space debris.

The debris removal norms are not drafted or specified by the governing bodies and key agencies. This has stemmed in the global market growth of the space robotics industry. To overcome such issues like space debris, the scientists around the world have anticipated the orbital-use fees agreement to reduce space debris in future. The universal agreement needs to be made to charge the space workers on an orbital-use

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fees basis. Under such contract, the space robotics collision risk can be decreased to a certain level.

The space robotics market is segmented on the basis of solution, application, end user, and region. On the basis of solution, it is divided into remotely operated vehicles, remote manipulator system, software, and services. On the basis of application, it is classified into exploration missions, satellite servicing, and space infrastructure assembly. On the basis of end user, it is bifurcated into commercial and government. On the basis of region, the market is analyzed across North America, Europe, Asia-Pacific, and LAMEA.

The key players have adopted product development and product launch as their key development strategies in the deep space robotics market. The key players operating in this market are Altius Space Machines, Astrobotic Technology, Honeybee Robotics, ispace Inc., Maxar Technologies, Motiv Space Systems Inc., Northrop Grumman Corporation, Oceaneering International, Inc., Olis Robotics, and Space Applications Services.

Key Benefits For Stakeholders

This report provides a quantitative analysis of the market segments, current trends, estimations, and dynamics of the deep space robotics market analysis from 2023 to 2033 to identify the prevailing deep space robotics market opportunities.

The market research is offered along with information related to key drivers, restraints, and opportunities.

Porter's five forces analysis highlights the potency of buyers and suppliers to enable stakeholders make profit-oriented business decisions and strengthen their supplier-buyer network.

In-depth analysis of the deep space robotics market segmentation assists to determine the prevailing market opportunities.

Major countries in each region are mapped according to their revenue contribution to the global market.

Market player positioning facilitates benchmarking and provides a clear

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understanding of the present position of the market players.

The report includes the analysis of the regional as well as global deep space robotics market trends, key players, market segments, application areas, and market growth strategies.

Additional benefits you will get with this purchase are:

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Consumer Buying Behavior Analysis

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Distributor margin Analysis

Brands Share Analysis

Key Market Segments

By Solution

Remotely Operated Vehicles

Remote Manipulator System

Software

Services

Sub-segment

Active Debris Removal (ADR) and Orbit Adjustment (Fastest)

Robotic Servicing

Refuelling

Assembly

By Application

Space Exploration

Satellite Servicing

Space Infrastructure Assembly

By End User

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- Government
- Commercial

By Region

- North America
  - U.S.
  - Canada
  - Mexico
- Europe
  - UK
  - Germany
  - France
  - Italy
  - Russia
  - Rest of Europe
- Asia-Pacific
  - China
  - Japan
  - India
  - Australia

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South Korea

Rest of Asia-Pacific

LAMEA

Latin America

Middle East

Africa

Key Market Players

Maxar Technologies

Ceres Robotics Inc.

Space Applications Services

Northrop Grumman

Astrobotic Technology

Lunar Resources, Inc.

Made In Space,Inc.

Motiv Space Systems Inc.

Honeybee Robotics

iSpace Inc.

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Contents

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List Of Tables

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List Of Figures

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