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EXTENDING SATELLITE UPTIME THROUGH ROBOTIC MAINTENANCE

Abstract

Satellites are an important part of our modern communication and navigation systems. These machines are launched into space to orbit the Earth and provide us with important services. However, satellites have a limited lifespan and may experience technical problems requiring maintenance. Traditionally, satellites that malfunction or run out of fuel are left in orbit until they are eventually deorbited and become space debris. It was an inefficient and expensive practice. To solve this problem, researchers have developed a solution: to extend the operational lifetimes of satellites through robotic maintenance. This approach involves using robots to repair, refuel or upgrade satellites in space. Robotic maintenance is cost effective as it eliminates the need to launch new satellites to replace old ones. It can also extend the life of existing satellites, reducing the need for frequent launches. It also helps reduce space debris by keeping satellites in orbit longer. Robotic maintenance also reduces the risks associated with manned space missions. Sending astronauts to perform maintenance tasks on satellites is time-consuming and dangerous. Robotic systems reduce the risks associated with space exploration by removing the need for humans to be in space. The robots used for satellite maintenance are designed to withstand the harsh conditions of space. They are equipped with advanced sensing technologies that allow to identify and diagnose technical problems in satellites. The robots can then perform tasks such as repairing damaged components, refueling empty tanks, or upgrading software on satellites. By using robots, we can reduce the risk of human error and ensure a successful replacement. Using robots to replace microprocessors on satellites can save time and money while improving reliability and performance. With robotics technology advancements, robots can work efficiently in harsh environments with greater precision and without fatigue. As technology continues to advance, we can expect to see more sophisticated robotic maintenance systems that will further extend the lifeofsatellites.