

# Low Earth Orbit (LEO)

<sup>1</sup>Abdulrhman W Almulhim, <sup>2</sup> Abdullah A Alnaim  
Saudi Aramco

**Abstract:-** Low Earth Orbit (LEO) is a popular topic in the field of space exploration and satellite communication. LEO is a popular orbit for various satellite missions due to its advantageous characteristics.

## I. INTRODUCTION

LEO refers to a region of space that is relatively close to Earth, typically ranging from 160 kilometers (100 miles) to 2,000 kilometers (1,200 miles) in altitude. In LEO, satellites orbit the Earth at relatively high speeds, completing one orbit in approximately 90 minutes. This fast-orbital velocity allows for quick data transmission and enables satellites to cover large areas of the Earth's surface. It is particularly beneficial for applications such as Earth observation, weather monitoring, and communications.

## II. LEO DEPLOYMENT

Low Earth Orbit satellite are affected by gravity of the earth, in other hand satellite at this altitude have to move at extraordinary speeds to partially escape the pull of Earth's gravity. A satellite in low Earth orbit travels at a mean velocity of 26,000 to 27,000 km per hour or 17,000 miles per hour. LEO plays a vital role in various industries, including telecommunications, navigation, scientific research, and national security. The deployment of large constellations of LEO satellites, such as those planned for global broadband internet coverage, has gained significant attention in recent years.

## III. SATELLITE CONSTELLATION

Low earth orbit satellite locates at near distance to the earth and moves in high speed to escape from the effect of gravity, therefore the coverage area of the satellites is very small and very short in time, therefore we need a satellite constellation. Satellite constellation is group of satellite working in concert, in such a way to operating together under shared control, synchronized so that they overlap well in coverage.

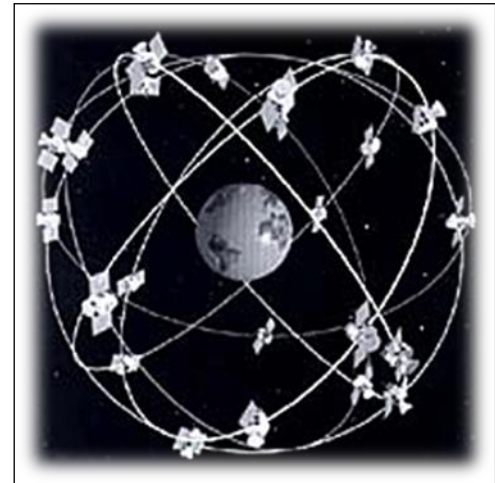


Fig 1 GPS Satellite Constellation

## IV. PROS AND CONS

LEO satellites offer several advantages over satellites in higher orbits. They experience lower latency, which is crucial for real-time applications like telecommunications and remote sensing. Additionally, the proximity to Earth reduces the power required for communication, resulting in smaller and more cost-effective satellite systems. The low altitude of LEO also contributes to a shorter lifespan for satellites due to the atmospheric drag they experience. However, this drawback is mitigated by the ability to regularly replace and upgrade satellite constellations, ensuring continued functionality and technological advancements.

## V. CONCLUSION

Overall, Low Earth Orbit offers numerous benefits for satellite missions, making it a preferred choice for a wide range of applications. Its proximity to Earth, fast orbital speed, and lower latency make it an ideal orbit for many space-based technologies.

## REFERENCES

- [1]. Understanding low earth orbit
- [2]. Low earth orbit
- [3]. Advantages and dis advantages of LEO
- [4]. The disadvantage of Leo
- [5]. Low earth orbiting
- [6]. Satellite constellation