23rd IAA SYMPOSIUM ON SPACE DEBRIS (A6)
Interactive Presentations - 23rd IAA SYMPOSIUM ON SPACE DEBRIS (IP)

Author: Ms. Dan Hu
France

Mr. Hanrui Zheng
France

ANALYSIS OF THE OCCUPATION STATUS OF EARTH'S ORBIT BY IN-ORBIT AND PLANNED SATELLITES

Abstract

This paper provides an overview of the current and projected occupation status of Earth's orbit, focusing primarily on Low Earth Orbit (LEO), while briefly addressing Medium Earth Orbit (MEO) and High Earth Orbit (HEO). The analysis highlights the rapid growth of satellite deployments, particularly in LEO, which is significantly more congested compared to MEO and HEO. The paper examines the occupied range of LEO by deployed, deploying, and planned satellite constellations. These constellations include major telecommunication networks such as Starlink, Kuiper, OneWeb, SpaceSail, Guowang, Lightspeed, IRIS, Lynk, AST, Globalstar, and Iridium, along with prominent remote sensing constellations like Spire, ICEYE, Planet Labs, and Jilin. Special attention is given to identifying the most heavily utilized LEO orbital shells and their distinctive characteristics, which are critical for policy-making and orbital carrying capacity assessment. Finally, the paper discusses the pivotal role that the International Telecommunication Union (ITU) can play in coordinating space carrying capacity assessment and allocation, offering recommendations for international collaboration and regulation to ensure sustainable space activities.