Paper ID: 88157
oral

IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advance Higher Throughput Communications for GEO and LEO satellites (3)

Author: Dr. Timur Kadyrov
International Telecommunication Union (ITU), Switzerland

ASSESSING IMPACT OF THE CHANGES IN ACTUAL DEPLOYMENT OF A SATELLITE SYSTEM ON THE STATUS OF RECORDING IN ITU

Abstract

An international regulatory framework, which defines the obligations for satellite communication systems to provide radio interference-free operation, is adapting to address additional spectrum needs and to ensure that protection from harmful interference is granted only to satellite systems that are actually in use.

The International Telecommunication Union (ITU) World Radiocommunication Conference 2023 (WRC-23) approved a new resolution on tolerances for certain orbital characteristics of space stations deployed as part of non-geostationary satellite orbit (non-GSO) communication systems. This resolution aims to account for potential differences between the notified and deployed orbital characteristics. Moreover, WRC-23 granted operational flexibility in maintaining the non-GSO system while ensuring reasonable alignment over time between the number of non-GSO satellites deployed for a system and the number registered in the Master International Frequency Register, thus enjoying international recognition.

An essential part of new regulatory procedures is to ensure that recorded characteristics are modified to correspond to the deployed orbital characteristics. Such modification maintains the rights of recorded frequency assignments for international recognition only if it does not create more radio interference or claim more protection to other non-GSO systems as a result of such modification.

When the orbital characteristics of a non-GSO system start deviating from the recorded orbital characteristics or when such a system experiences an intermediate- or long-term reduction in the number of satellites deployed, an assessment is needed to determine whether such change will cause more radio interference or require more protection than would otherwise be the case for operation in accordance with the recorded characteristics. This assessment involves conducting an interference analysis that considers all potentially affected satellite systems.

The presented paper investigates different steps of such interference analysis and considers dynamic orbit simulation to predict potential changes in the interference environment between non-GSO systems. The analysis highlights that unless orbital characteristics are marginally deviating, it is impossible to determine whether such deviation would not cause more interference without conducting an interference analysis. Even a reduction in the number of satellites deployed may result in an increase in interference, as it limits the operational flexibility of the system in interference management.