

IAF SYMPOSIUM ON SECURITY, STABILITY AND SUSTAINABILITY OF SPACE ACTIVITIES
(E9)Interactive Presentations - IAF SYMPOSIUM ON SECURITY, STABILITY AND SUSTAINABILITY
OF SPACE ACTIVITIES (IPB)

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

Mr. Hon Fai NG
ITU, Switzerland
Mr. Xavier Laurenson
International Telecommunication Union (ITU), Switzerland
Ms. Xueling Zhang
ITU, Switzerland

IDENTIFICATION OF COMMUNICATION SPACECRAFTS AND VALIDATION OF THEIR
ORBITAL PARAMETERS WITH RESPECT TO MASTER INTERNATIONAL FREQUENCY
REGISTER OF ITU**Abstract**

The basis for an international regulatory framework, which defines the obligations and requirements for systems using Earth orbits to ensure their radio interference-free operation, was established last century by the International Telecommunication Union (ITU). As part of the Intergovernmental Treaty governing the allotment of radio frequencies and the registration of radio-frequency assignments for space services at any associated orbital position in the geostationary-satellite orbit or any associated characteristics of satellites in other orbits, this framework requires maintaining the Master International Frequency Register and ensuring that only the frequency assignments that are actually brought into use and are in continuous operation enjoy international recognition and protection from harmful interference.

For communication satellites, this involves determining whether the operation of a frequency assignment is supported by an actual spacecraft in orbit with the capability of receiving and/or transmitting on registered frequencies.

This paper addresses the problem of identifying whether a communication satellite can be considered as supporting the continuous operation of a registered frequency assignment. Available information on the determined orbital characteristics of the satellite is used to check whether these characteristics correspond to the ones filed to the ITU. The analysis presented in the paper covers traditional scenarios involving verification with respect to satellites using geosynchronous orbit. Furthermore, since a significant number of satellites are already in operation or envisaged in the planned low or medium Earth orbit (LEO/MEO) constellation architectures, this analysis extends to the case of non-geostationary satellites utilizing LEO or MEO. The aim of the analysis is to provide methodological guidance to map orbit prediction two-line elements data of known objects available from publicly available catalogues to the ITU notified orbital characteristics.

Furthermore, this analysis identifies certain limitations for the applicability of the framework in case of satellites on decaying orbit.