

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advanced Technologies (5)

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DISPOSAL OF NON GEOSTATIONARY ORBIT (NGO) SATELLITES

Abstract

Regulators in the United States require as a condition for commercial communications satellite licenses that each operator provide a plan specifying how newly proposed satellites will be disposed in outer space after their projected usable lifetime in a manner unlikely to cause future damage to other existing and planned satellites.

This requirement was originally developed for geostationary communications satellites. It has typically been met by operators reserving sufficient end of life (EOL) on-board propellant to maneuver the satellites into a circular orbit, either higher or lower than the geostationary orbit at decommissioning. Last year, a non geostationary orbit (NGO) broadcast satellite was licensed by the United States to provide future improved satellite digital audio radio service (SDARS). Since no prior NGO satellites had been licensed in the United States since the disposal requirement was established, it became necessary to propose a disposal plan for this type satellite orbit.

The subject NGO satellite is being implemented for an operating geosynchronous orbit with inclination of 55 degrees and eccentricity of 0.25. These two parameters distinguish this orbit from a geostationary one where the inclination and eccentricity are near zero. The NGO satellite's projected useful lifetime is 15 years. The paper describes the development of the disposal plan, the technical elements considered (e.g., long term orbit disturbing forces) and the analyses conducted. The resulting plan is summarized, which is basically the use of the satellite's on-board EOL propellant to achieve an inclined circular disposal orbit with an orbital altitude between the geostationary orbit and the orbits of navigation satellites (e.g., Galileo). The analyses show that this disposal orbit is stable for at least 100 years.