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ORBITAL CONGESTION: ASSESSING THE PROSPECTS FOR EFFECTIVE GOVERNANCE
STRUCTURES THROUGH REGIME THEORY

Abstract

Orbital congestion, and the dangers it poses to the safety and sustainability of space activities, has been increasingly calling for the establishment of sound international measures to minimize the impact of debris on satellite operations, to mitigate the creation of new debris, and to reduce the population of debris in orbit. Yet, a number of political and legal hurdles prove to stand in the way. Arguably, the effectiveness of the various initiatives undertaken in the areas of space traffic management, debris mitigation and active debris removal will be ultimately determined by the successful creation of proper governance structures, here defined as a combination of principles, norms, rules and decision-making processes upon which actors' interests converge in a given-issue area of their interaction. In this respect, International Relations Theory has developed a meaningful set of tools to better frame the various configurations of interest, and to assess their different implications for the kinds of governance structures that must be put in place if actors are to avoid Pareto sub-optimal outcomes. Through the application of a regime-based analysis, this paper assesses the prospects of the currently on-going efforts to create effective governance structures to cope with the three main facets of the debris challenge, namely: debris mitigation, debris removal and space traffic management. Game Theory pay-off matrixes (e.g. Stag Hunt, Battle of Sexes, Prisoners Dilemma, among the others) are introduced to explain different configurations of interests and potential variation in outcomes. The study will in particular put the spotlight on how available options are structurally constrained, and explain why and how the prospects for achieving success vary across specific issues. The innovative character of this paper is that it provides new tools and perspectives to understand the nature of the challenges faced by the space community and facilitate the identification of the appropriate mechanisms that will need to be put in place in order to ensure a safe and sustainable utilisation of the space environment.