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Author: Ms. Maggie Allen
Embry-Riddle Aeronautical University, United States

THE COST OF CONSTELLATIONS: AN ANALYTICAL APPROACH TO IMPLEMENTING SPACE TRAFFIC MANAGEMENT POLICY

Abstract

As the commercial space industry continues to grow, there are rising concerns about orbital crowding and congestion. Currently, there are 2,666 active satellites in Earth orbit, this is 46% of the 5,774 objects that are being tracked in orbit. For decades, both national and international discussions between government and industry have reiterated the need for a system of space traffic management (STM). Recent policy updates in the U.S., for instance, are addressing challenges to space situational awareness and STM given the increase of space debris and deployment of mega-constellations such as SpaceX's Starlink – a satellite constellation composed of up to 42,000 satellites. Additionally, there have been international working groups developing guidelines and recommendations regarding certain aspects of STM, such as debris monitoring and mitigation, but not necessarily Space Traffic Management with all of its component parts. Based on the concerns of governments and industry, a comprehensive STM policy should include the following components: (1) adequate spectrum regulation for all spacecraft, (2) further action regarding space debris monitoring and mitigation, and (3) improved coordination of civil, military, and commercial launch vehicles, spacecraft, and reentry vehicles. The purpose of this paper is to survey the issues and challenges of STM policies and practice, current national regulatory and industry perspectives on STM. First, this paper will highlight international law and policy developments relevant to space traffic management, including soft law initiatives and guidelines on space sustainability, space situational awareness and STM. Secondly, this work will analyze how these guidelines are applied under the United States' national regulatory framework. In conclusion, a space traffic management system is likely to be supported through soft law guidelines, policy, updating national legislation, and coordination between international and national regulators.

Key Words: space traffic management, spectrum regulation, space debris, mega-constellation, soft law guidelines