Chapter 9

Mega-Constellations: Legal Aspects

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ABSTRACT

As a reflection of the fast-paced world we currently live in, a new era in satellite technology begins to emerge. This sector, of vital importance for our day-to-day lives, is in a period of significant change, characterized by the use of large satellite constellations. These mega-constellations aim to provide, among other things, worldwide internet coverage. Since 2015, satellite internet providers such as Space X and OneWeb have been working on the idea of mega-constellations and intend to launch circa 4,000 and 882 satellites respectively, thus forcing satellite manufacturers to lower the costs drastically. However, many legal issues may arise since the vast amounts of satellites will significantly increase the risk of collision with other satellites or spacecraft.

INTRODUCTION

According to the United Nations Office for Outer Space Affairs (UNOOSA), in 2018 there are 2075 satellites orbiting around the Earth. (Online Index, 2018). Soon, this figure will be greatly increased due to the incorporation of large satellite constellations formed by hundreds or even thousands of satellites. It is obvious that the increase in the number of satellites will be accompanied by an increase in risk of collision and a number of legal issues that have not been addressed so far. The current tendencies will change the outer space environment and its traditional principles in a radical way. (Vila, 2016).

In 2016, Elon Musk asked for prior permission to the Federal Communications Commission (FCC) to launch a constellation of 4,425 satellites during the next ten years with the purpose of offering a global satellite Internet service. (De Selding, 2016). Needless to say that the Space Surveillance and Tracking segment of the Space Situational Awareness (SSA) Programme will gain more importance due to the thousands of new satellites launched into outer space. On the bright side, companies like OneWeb aim to use these macro-constellations to provide communication service to anywhere on Earth, hence facilitating the access to communications of developing countries.

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The number of launches every year is expected to be constant even if the complete constellation is deployed in its entirety, since these types of satellites will have to be constantly replaced due to its relatively short life span. (De Selding, 2016). Logically, the number of collisions will significantly increase because of the high concentration of functional and non-functional satellites.

As a response to the imminent risk posed by macro-constellations, the next question must be discussed: How do space actors, public or private, decide which orbit or which frequency they will use in order to not interfere with the activities of other actors? This chapter tries to answer this question by explaining what is the role played by the International Telecommunication Union (ITU or the Union). Interestingly, the ITU, which is the oldest international organisation, is the one in charge of managing and coordinating this state-of-the-art technology. The Union is a specialised agency of the United Nations and is in charge of promoting and making accessible communications systems to both developed and developing countries. Therefore, it is from paramount importance to understand the structure, the current legal framework of the ITU, and how the process of orbit/spectrum allocation works. This chapter intends to give the reader a broad insight of the legal framework of the ITU in order to better understand the legal complexities lying behind macro-constellations.

Finally, the chapter will analyse and discuss the main problem arising from macro-constellations in light of the current international legal framework. The growing number of space debris in such important resources as the geostationary orbit or the low-Earth orbit presents one of the major drawbacks and threats posed by large satellite constellations. (Leinberg, 1989). As a result of the broadly drafted Corpus Iuris Spatialis, and due to the legal uncertainty it creates, states and international organisations have adopted a number of legal guidelines to promote space debris mitigation. (De Man, 2013). These mitigation guidelines are essential, albeit not sufficient. Their non-legally binding character makes it difficult to implement them thus requiring a compelling series of international legislation that can address this important problem. The most important recommendations will be discussed.

BACKGROUND

In order to provide a complete background to the reader, this part will focus on three main aspects that will help to understand the relevance of the ITU in light of the advent of macro-constellations. These three sections are the history, the structure and the legal framework of the Union.

Firstly, from a historical perspective it is worth noting that, since its conception, telecommunications have morphed from a military application into an essential global network able to connect people around the world. Due to its nature at the moment of its inception, there was a lack of international cooperation and a general sentiment of reluctance towards connecting the networks, since it could be seen as detrimental to the sovereignty of the States. There were numerous national telegraph networks that were not interconnected amongst each other and, therefore, it required a vast amount of separate agreements between countries to regulate the different aspects of telegraphy, an essential cornerstone for telecommunications. (Coddling & Rutkowski, 1982) (Bernhardt, 1984). It is important to remark the first two main organisations that laid the foundations for the future ITU. In 1850, Prussia, Austria, Bavaria and Saxony established the Austro-German Telegraph Union. It was soon followed by the creation of the West European Telegraph Union on 29 December 1855 by Belgium, France, Sardinia, Spain and Switzerland. Despite the great uniformity across the continent, there were still two separate actors regulating the same activity. As a solution for the absolute dissonance and for the sake of establishing