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Delimitation of air space and outer space - a new approach

Introduction

For many decades, one can even say since outer space law began to develop it became an important problem of where air space ends and where outer space starts.

Why does this delimitation matter in this respect? The question is rather simple to answer. The legal regimes for air space and outer space are fundamentally different. In airspace, we have since the Paris Convention of 1919 the sovereignty of subjacent states over their airspace. On the other hand, since the Outer Space Treaty of 1967 and even before, and now valid as a norm of customary international law, we find that outer space is a *res communis omnium,* a space that can be used by everybody free of any licencing. And this has of course also tremendous repercussions on possible licencing. It is not allowed to fly through airspace without a respective permission, normally provided by bilateral air transport agreements. On the other hand, one is entirely free to go and fly to outer space, through outer space and from outer space. Therefore, the delimitation of both areas has always been a problem and the problem has been resolved in a traditional way like I will show in the main part. However, in my opinion this traditional delimitation is not sufficient any longer. There is new technology that requires new solutions. Therefore, this paper has for purpose to show and to make an attempt to find a new solution.

The Delimitation Theories

So far, two main theories have developed. There is the so-called spatialist approach and there is the functionalist approach.

1. Spatialist Theory

According to the spatialist approach, an atmosphere related boundary between airspace and outer space can be set.[1] However, as it is difficult to fix exactly, where the lowest layer of the atmosphere ends, different altitudes ranging from 80 to about 120 kilometres having proposed. The so-called *van Kármán Line*[2] at around 100 kilometres is usually used to define the altitude where the atmosphere is so thin that an airplane cannot be sustained by aerodynamic forces. Therefore this

[1] See only Lyall/Larsen, Space Law. A Treatise, 2nd. Ed. 2018, 143 - 151.
[2] See Lyall/Larsen, note 2, 148 with further references.

line has been accepted by the International Aeronautical Federation (IAF) as a boundary between airspace and outer space. This approach has also been supported by some state practice by setting a fixed delimitation line at 100 kilometres between airspace and outer space – for example, by Australia in its Space Activities Act of 1998[3] and the National Space Legislation in Demark of 2016.[4] Moreover, we find also Kazakhstan' s the third country that adheres to this delimitation.[5]

One must however take into account that it is aviation technology that so far allows an airplane to fly not higher than 27 kilometres while the lowest orbit completed by a satellite lies at 84 kilometres. Therefore, delimitation based on the so-called spatialist approach offers a solution only from an outer space perspective.

2. The Functionalist Theory

The functionalist approach rather than proposing a strict delimitation line between airspace and outer space takes into consideration the function of a vehicle. If an object is intended to reach outer space this is an exercise of space activities and space law would be applicable. If a vehicle is designed for flying only in the airspace, then it is an aircraft with aviation law applicable.[6]

New Consideration

The area between those altitudes which are used neither for the operation of aircraft, nor of satellites consists of different layers in which oxygen molecules get lesser and lesser, the more distant they are from Earth. The example for such so-called aerospace objects – vehicles which are capable both of travelling through outer space and of using their aerodynamic properties to remain in airspace for a certain period – shows that the spatialist and the functionalist approaches would provide different solutions. According to the spatialist approach air law could be applicable to the vehicle while in airspace and space law after the boundary to outer space has been crossed. The functionalist approach would, if the main purpose of the vehicle is to reach outer space or to operate in outer space, apply space law to the whole duration of the operation of the vehicle even though while in airspace, it would fly using aerodynamics.

More recently, a new technology, which is relevant to the question of delimitation, has gained attention, so-called high-altitude pseudo-satellites (HAPS). HAPS are remotely piloted vehicles, which can provide satellite-like services and receive their energy from batteries. They fly or float at around 20 to 30 kilometres altitude with a duration of up to several weeks or months.

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[3] Space Activities Act, 1998.

[4] Outer Space Act, Denmark of 11 may 2006, Part 4.

[5] Art. 1 (6), Law of the Republic of Kazakhstan on Space Activities, 6 January 2012, 2012 Nr. 528 – IV.

[6] See Lyall/Larsen, supra note 2, 145 et seq.

Flying a bit higher than conventional aircraft functioning as high altitude drones but *de facto* offering services more like satellites, HAPS enable continuous coverage of the territory below. Furthermore, HAPS can enhance data transfer and signal precision in satellite networks offered by activities between satellites and ground stations or between satellites and drones at a lower altitude. Thus, HAPS can be considered to be the missing link between drones and satellites.

Therefore, it is submitted that up to 27 kilometres, the altitude that airplanes can go there is uncontestably airspace.

Anything higher than 84 kilometres will also certainly belong to outer space.

But the question is what happens between 28 and 83 kilometres? How is this so-called "*mesospace"* be described? Does it belong to airspace or outer space? And is this question really correctly asked?

My proposal is the following: for these 55 kilometres of "*mesospace"* the so-called functional theory should apply. This theory again determines whether something is a space object or an aviation object according to the fact whether its intention is to go into outer space or not. If we, for example, take sub-orbital vehicles for space touristic activities, it is crucially important whether the respective vehicle intends to finally go into outer space – which is the case so that space law is applicable. If this would not be intended it would be an aviation vehicle and air law would be applicable. So, for these questions, however, space law is applicable.[7]

I think that this new delimitation creates more clarity and is therefore a real improvement to what we have had so far.

[7] Hobe, Space Law, 2019, 14.