



General Assembly

Distr.: General
19 February 2021
English
Original: English/Spanish

Committee on the Peaceful Uses of Outer Space

Questions on suborbital flights for scientific missions and/or for human transportation

Note by the Secretariat

Addendum

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II. Replies received from Member States

Myanmar

[Original: English]

[18 January 2021]

Question (a). Is there a relationship between plans to establish a system of space traffic management and the definition and delimitation of outer space?

Yes, there is a relationship between plans to establish a system of space traffic management and the definition and delimitation of outer space.

Space traffic management is defined by the International Academy of Astronautics as “the set of technical and regulatory provisions for promoting safe access into outer space, operations in outer space and return from outer space to Earth free from physical or radio-frequency interference”.

The International Association for the Advancement of Space Safety establishes the following operational boundaries between airspace and outer space:

- (a) 160 km, lowest practical operating orbit for satellites;
- (b) 120 km, re-entry threshold for space systems;
- (c) 50 km, upper limit of atmospheric buoyancy (balloons);
- (d) 18 km, upper limit of civil aviation traffic.

One alternative would be to define altitudes of 50 to 160 km as “near space” for legal purposes.

Myanmar is of the view that near-space operations are a potential threat to air traffic and the public below in the event of failures or malfunctions. They are also a threat to outbound and inbound space traffic.

Question (b). Is there a relationship between suborbital flights for scientific missions and/or for human transportation and the definition and delimitation of outer space?

Yes. Suborbital flights are in outer space for a limited duration; they are unable to remain in orbit and must re-enter the Earth’s atmosphere. Therefore, they can be said to operate in the areas of outer space, near space and airspace, which means that they can easily affect the sovereignty of nations and their airspace in the event of any failures. It follows that there is a direct relationship between suborbital flights and the definition and delimitation of outer space.

Question (c). Will the legal definition of suborbital flights for scientific missions and/or for human transportation be practically useful for States and other actors with regard to space activities?

The establishment of a clear, stable and uniform legal definition of suborbital flights will be practically useful for States and other actors that plan to operate such vehicles. For Myanmar, however, it is not yet practically useful as our national satellite system is at the planning stage and there are currently no plans for suborbital flights.

Question (d). How could suborbital flights for scientific missions and/or for human transportation be defined?

They could be defined as future space transportation vehicles built for commercial benefit and aimed at persons with the desire and financial means to travel to outer space for recreational purposes.

Question (e). Which legislation applies or could be applied to suborbital flights for scientific missions and/or for human transportation?

Both air law and space law could be applied to suborbital flights for scientific missions and/or for human transportation because suborbital flights operate in the three zones above the Earth. In addition, a new, delineated regime of aerospace law should be applied to them.

Question (f). How will the legal definition of suborbital flights for scientific missions and/or for human transportation impact the progressive development of space law?

On the basis of technological developments in the space community, provisions on suborbital flights should be added to existing space law. In that way, the legal definition of suborbital flights for scientific missions and/or for human transportation will affect the progressive development of space law.

Question (g). Please propose other questions to be considered in the framework of the legal definition of suborbital flights for scientific missions and/or for human transportation.

We would like to propose that the following questions are considered:

- (a) How will companies that offer suborbital flights ensure the safety of space tourists or persons on a space trip?
- (b) How much time should pass between the completion of a suborbital flight and the departure of the next space trip?
- (c) How many space trips can a flight make during the lifetime of the vehicle?
- (d) What information should be added to the framework on the safety and peaceful use of suborbital flights so as to ensure that no harm is done to society and space communities?
- (e) What insurance or compensation schemes have been planned in the event of an accident involving persons on a space trip?

Philippines

[Original: English]
[20 January 2021]

Question (a). Is there a relationship between plans to establish a system of space traffic management and the definition and delimitation of outer space?

Plans to establish a system of space traffic management may benefit from the definition and delimitation of outer space, which would bring clarity and security to the application of “space traffic rules” that may be implemented at a later stage by space traffic management systems. This definition may also assist in harmonizing the mandates of various government agencies and departments and allow these actors to work towards ensuring the safe and responsible conduct of space activities.

Question (b). Is there a relationship between suborbital flights for scientific missions and/or for human transportation and the definition and delimitation of outer space?

Suborbital flights for scientific missions and/or for human transportation may need to be regulated at both the national and international levels. This regulation may require the definition and delimitation of outer space in order to draw the line between the application of air law and the application of space law. Any definition or delimitation of outer space must be responsive to advances or changes in technology relevant to suborbital flights for scientific missions and/or human transportation.

Question (c). Will the legal definition of suborbital flights for scientific missions and/or for human transportation be practically useful for States and other actors with regard to space activities?

A legal definition of suborbital flights for scientific missions and/or for human transportation may aid in the creation of a legal regime regulating the movement of space objects. This definition may also be helpful in distinguishing and coordinating between the activities of the aviation and space sectors and in identifying responsibility and/or liability for these activities. Any definition of suborbital flights for scientific missions and/or human transportation must be responsive to advances or changes in technology relevant to this matter.

Question (d). How could suborbital flights for scientific missions and/or for human transportation be defined?

Suborbital flights for scientific missions and/or for human transportation may be defined by identifying the purpose of the flight and its target or actual destination.

Question (e). Which legislation applies or could be applied to suborbital flights for scientific missions and/or for human transportation?

The Philippines does not currently have any national legislation applicable to suborbital flights for scientific missions and/or for human transportation. However, with regard to international legislation, the following treaties may be applicable:

(a) The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, in that there must be freedom of exploration and scientific investigation, which must be conducted for the benefit and interest of all humankind and for the maintenance of international peace. The Philippines is a signatory to but has not ratified this Treaty;

(b) The Convention on Registration of Objects Launched into Outer Space, in that when a space object is launched into Earth orbit or beyond, the launching State must register the object. The Philippines is a signatory to but has not ratified this Treaty;

(c) The Treaty on the Non-Proliferation of Nuclear Weapons, specifically the provision banning nuclear testing in outer space. The Philippines has ratified this Treaty.

Question (f). How will the legal definition of suborbital flights for scientific missions and/or for human transportation impact the progressive development of space law?

The legal definition of suborbital flights for scientific missions and/or for human transportation may assist in establishing a foundation for the creation of laws governing the commercialization of outer space, the international responsibility of States in the conduct of their space activities and the indispensable participation and responsibilities of the private space sector. Any definition of suborbital flights for scientific missions and/or human transportation must be responsive to advances or changes in technology relevant to this matter.

Question (g). Please propose other questions to be considered in the framework of the legal definition of suborbital flights for scientific missions and/or for human transportation.

We do not have any additional questions to propose in relation to this matter.

Spain

[Original: Spanish]
[14 January 2021]

Question (a). Is there a relationship between plans to establish a system of space traffic management and the definition and delimitation of outer space?

It seems clear that a system of space traffic management and the delimitation of outer space will be of irrefutable importance, particularly in relation to liability, since the legal provisions governing liability in airspace (absolute liability) are inconsistent with the provisions governing liability in outer space (relative liability and cross-waiver of liability). It is therefore important to delimit outer space in order to determine the applicable legal regime. The Convention on International Civil Aviation should govern matters relating to airspace and the five space treaties (*corpus juris spatialis*) should govern matters relating to outer space.

Question (b). Is there a relationship between suborbital flights for scientific missions and/or for human transportation and the definition and delimitation of outer space?

As indicated in the previous response, and particularly in relation to human transportation, the provisions governing liability in respect of space activities must be taken into account. Moreover, the establishment of a clear legal definition and delimitation of outer space can certainly prevent conflicts of interest and clarify the scope of liability models. In this regard, a distinction could be made between Earth-to-Earth suborbital flights, which involve only very brief passage through outer space and to which it would be appropriate to apply air law in order to avoid legal uncertainties, and Earth-to-space suborbital flights, which would involve a longer period in space and to which, until such flights are regulated in some other way, it would be appropriate to apply air law while the craft is in airspace and space law while the craft is in outer space. It follows that the delimitation of outer space is essential in order to avoid legal uncertainties.

Question (c). Will the legal definition of suborbital flights for scientific missions and/or for human transportation be practically useful for States and other actors with regard to space activities?

The legal definition and regulation of suborbital flights call for legal solutions given that there is a significant regulatory gap that must be filled in order to prevent conflicts in the future. It is worth highlighting the dilemma posed by aerospace objects: they are space objects that have the characteristics of aircraft since they are capable of taking off horizontally and autonomously from an airport runway, passing through airspace to outer space and entering Earth orbit, and returning to airspace by their own means to land at an airport on Earth.

Question (d). How could suborbital flights for scientific missions and/or for human transportation be defined?

In the absence of an agreed definition of suborbital flights, we are dealing with an object of a hybrid nature that has the characteristics of both an aircraft and a space object, hence the term “aerospace object”. However, it is important to remember that the space treaties do not clearly define what is meant by a “space object”, which creates even greater ambiguity. For example, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, does not provide a definition of the term. Indeed, it refers to an object launched into outer space without any further semantic or legal consideration; the concept is also nebulous in other conventions, such as the Convention on International Liability for Damage Caused by Space Objects and the Convention on Registration of Objects Launched into Outer Space. Although article VIII of the Outer Space Treaty of 1967 expands on the concept of “space object” in the context of ownership of an object launched into outer space – indicating that the term encompasses objects landed or constructed on a celestial body and their

component parts remaining intact while these objects or parts are in outer space or on a celestial body and when they return to Earth – it does not define its legal scope. While article I (d) of the Liability Convention appears to seek to define “space object”, it is incorrect from a legal perspective since it merely refers to certain parts of the object in a descriptive and vague manner, stating that “The term ‘space object’ includes component parts of a space object as well as its launch vehicle and parts thereof”. Article I (b) of the Registration Convention is equally brief, adding nothing new to that earlier supposed definition. It is therefore recommended not only that the lower limit of outer space be defined, but also that a uniform definition of “space object” be established and that such objects be classified.

Question (e). Which legislation applies or could be applied to suborbital flights for scientific missions and/or for human transportation?

Insofar as suborbital flights are not yet defined or regulated by law, there is no option other than to apply air law while a craft is passing through airspace and to apply the space treaties while it is moving through outer space so as to ensure legal certainty and liability for any damage to air and space traffic.

Question (f). How will the legal definition of suborbital flights for scientific missions and/or for human transportation impact the progressive development of space law?

Both the delimitation of outer space and the legal definition of suborbital flights are prerequisites for the progressive development of outer space law. Within the framework of the United Nations, the Committee on the Peaceful Uses of Outer Space is the ideal forum for establishing those legal definitions, in view of the scientific expertise of its Scientific and Technical Subcommittee and the policy expertise of its Legal Subcommittee.

Question (g). Please propose other questions to be considered in the framework of the legal definition of suborbital flights for scientific missions and/or for human transportation.

Consideration could be given to the progress made within the framework of the law of the sea in accordance with the United Nations Convention on the Law of the Sea, which establishes a rational and internationally accepted delimitation of marine areas on the basis of the coastlines of coastal States. Accordingly, it might be possible to establish an agreed delimitation of airspace as the space over which the State over which an object flies has sovereignty up to an altitude of 100 or 110 km, where outer space would begin (on the basis that coastal States have sovereignty over the 12 nautical miles of territorial sea extending from their coastlines). An intermediate zone extending to an altitude of approximately 160 km could then be established (in keeping with the concepts of the contiguous zone or even the exclusive economic zone, where a jurisdictional regime applies, that is, States do not have the same exclusive sovereignty that they have over their territorial seas). Outer space could begin from that altitude of 160 km (similar to the concept of the high seas in that no State would have sovereignty over it since it would be part of the global commons). Suborbital flights would thus remain below the limit of 160 km above sea level and would be subject to comprehensive regulation with respect to jurisdiction under air law, fully respecting the sovereignty of the State over which the craft travelled, as is the case with regard to commercial flights of aircraft subject to the legal provisions established by the International Civil Aviation Organization. This would make it possible to overcome the legal gaps that beset the increasingly exponential growth in space activities.

III. Replies received from permanent observers of the Committee

Space Generation Advisory Council

[Original: English]
[26 January 2021]

Question (a). Is there a relationship between plans to establish a system of space traffic management and the definition and delimitation of outer space?

Yes. The legal end of airspace is the boundary to consider when creating rules of the orbital road for space activities and space law. Air and space have fundamental legal differences, the most pertinent of which is that airspace above sovereign territory is also sovereign, whereas outer space is not subject to appropriation. Space traffic management plans must therefore include a uniform boundary and rules to respect the equality of States under international law, unless agreed otherwise by consensus. The practicalities of future upper airspace and near-space traffic management may, however, require aerospace regulatory integration, both domestically and internationally, in order to coordinate hazard response and debris mitigation.

Question (b). Is there a relationship between suborbital flights for scientific missions and/or for human transportation and the definition and delimitation of outer space?

Yes. The spatialist approach, which proposes a clear demarcation between airspace and outer space, entails a definition of suborbital flight based on its capacity to reach a certain altitude. Under this approach, it is essential to delimit the two domains in order to locate the activity and identify the applicable legal regime. However, the approach does not consider the velocity of a suborbital vehicle and therefore its ability to reach orbit.

Alternatively, a functionalist approach requires a suborbital vehicle and its flight to be regarded as an activity. In this case, there is no substantial relationship between delimitation and definition of airspace and outer space, since the applicable legal regime is determined regardless of a suborbital vehicle's location.

Question (c). Will the legal definition of suborbital flights for scientific missions and/or for human transportation be practically useful for States and other actors with regard to space activities?

As illustrated by the previous answer, it will depend on the approach adopted. If a spatialist approach is adopted, the delimitation between airspace and outer space will have significant practical utility as it will steer the choice of the applicable legal regime between air law and space law. In this regard, a more complicated matter is the application of responsibility and liability regimes. Under this approach, a suborbital flight would require the application of two different legal regimes.

Under air law, States are responsible for aviation safety in their national airspace. A suborbital flight would fall under a regime of national responsibility while it was located in airspace. In contrast, once the flight reached outer space, it would be subject to the legal regime established by the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, with regard to responsibility and liability deriving from space activities. Therefore, it would be necessary to identify the multiple launching States liable for any damage for the portion of the activities conducted in outer space.

Question (d). How could suborbital flights for scientific missions and/or for human transportation be defined?

Suborbital flights can be defined as flights that can reach outer space (altitudes of 100 km or more above sea level) but at a velocity equal to or less than orbital velocity, which is not sufficient to orbit around Earth. These flights could be also defined on

the basis of their functionality, mission purpose and design, in order to understand their impact on applicable air or space regulations.

Question (e). Which legislation applies or could be applied to suborbital flights for scientific missions and/or for human transportation?

Domestic air and space law, according to the respective approaches of States to delimitation. International civil aviation law (United Nations treaties and bilateral, multilateral and regional air service agreements) may be adapted to accommodate civil suborbital human transportation, or international space law may apply. Bilateral, multilateral or regional agreements on scientific cooperation may also apply.

Question (f). How will the legal definition of suborbital flights for scientific missions and/or for human transportation impact the progressive development of space law?

The legal definition of suborbital flights will affect the determination of applicable law. Legally, certainty regarding applicable law will then affect registration requirements for suborbital vehicles, liability rules and criteria for transferring ownership over such vehicles. The definition of these activities thus has the potential to harmonize national regulatory approaches to suborbital activities, both domestically and internationally, through further bilateral or multilateral agreements.

Question (g). Please propose other questions to be considered in the framework of the legal definition of suborbital flights for scientific missions and/or for human transportation.

(a) What is the role of the International Civil Aviation Organization and domestic airspace regulations in the regulation of suborbital flights for scientific or human transportation purposes?

(b) What are the legal solutions for dealing with the entry into airspace of orbital debris while at the same time respecting territorial sovereignty and achieving sustainability in space activities?
