

# **Space natural resources and Solar Power Satellites: some legal issues**

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## SOLAR POWER SATELLITES (SPS)

The exploitation of solar energy in the Geostationary Orbit (GSO) through the Solar Power Satellites (SPS) program raises a series of legal issues, mainly caused by the placement of a structure into a space (the GSO), whose extension is limited and made scarce by:



the large number of artificial satellites (placed for communications, navigations, Earth observation purposes)

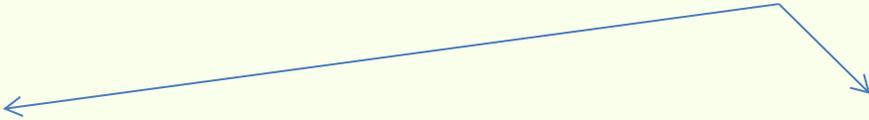
the significant and growing demand for other satellite placements (especially by new emerging economies)

## SOLAR POWER SATELLITES (SPS)

Many attempts have been done to find a solution, even through the adoption of different approaches by the International Telecommunication Union, such as the *a priori* and the *a posteriori* ones.

Notwithstanding, trading orbital slots has taken place, giving rise to the “*paper satellites*” problem.

The ITU has pointed out as this speculative system has resulted



on the one hand, in a significant waste of resources on the part of satellite operators, administrations and the ITU itself

on the other hand, in a *de facto* appropriation of a space resource (Orbit), so breaking both Article II of the Outer Space Treaty (OST) and the “rationale” in using natural resources, that consists of the equitable access to and the rational and efficient use of the natural resources

## SOLAR POWER SATELLITES (SPS)

From this perspective, the ITU has always upheld that all nations – both rich and poor - have the right “*to equal affordable access to satellite orbit space*”

- These and other issues make the definition of clearer rules in – but not limited to - the field of Solar Power Satellites a priority.



As a consequence, we wonder how and to what extent such a new legal framework may be implemented:

through a new re-examination of the ITU regulations?

or through international cooperation?

However, we need to take into account, *inter alia*:

- the need to attract investments for launching the SPS program;
- the need to avoid potential conflicts between States;
- the global or continental SPS dimension;
- as well as the need of keeping a public control over involved entities, so as to comply with general principles of space law.

## SPS: THE LEGAL ISSUES

### SPS Legal Issues

- Before focusing on some legal issues affecting SPS, it should be clarified that the link between the different projects aiming at implementing the SPS is collecting solar power in space.
- The energy collected would be then transmitted on Earth both through laser or microwave that would pass through the airspace, with the consequence that the microwave or laser could breach Article 1 of the Chicago Convention of 1944, which states that the Contracting States to the Convention recognize that every State (not merely Contracting States but any State) has complete and exclusive sovereignty over the airspace above its territory.
- However, we can resort to “functional” criteria, according to which, since the SPS is deemed as a space activity, rules and principles of space law shall apply to it.

**Article 1 of the Chicago Convention: The contracting States recognize that every State has complete and exclusive sovereignty over the airspace above its territory**

## The freedom of use and exploration of outer space and the non-appropriation principles

- **Article I, Paragraph 2** of the **OST** lays down the fundamental legal principle of freedom of exploration and use of outer space by all States, while **Article II** of the **OST** makes provision for the “common interest” principle. Both are of paramount importance for space law, and are particularly important for the activity of exploitation of space resources.
  - As it refers to the freedom of use of outer space, Article I may allow exploitation activities, while Article II limits those activities as these ones cannot amount to a kind of appropriation.
- The notion of **appropriation** consists of three elements:

*USUS*

the ability to use a  
resource

*Fructus*

the ability to harvest its  
fruits

*abusus*

the ability to destroy, to give  
and to sell the resource

Article I, Paragraph 2, OST: Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.

Article I, Paragraph 2, OST: Outer Space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means

The freedom of use and exploration of outer space and the non-appropriation principles

Since **solar power is an unlimited natural resource** that cannot be destroyed and does not exclude its use by other States, the exploitation of that resource cannot be deemed as its appropriation, since it would lack the *abusus* element



Therefore, **the issue** does not concern the use of natural resource itself, but it affects the **allocation of slots** for positioning the SPS structure in orbit whose extension is limited

Solar power cannot be either finished or destroyed, but the establishment of SPS in the geostationary orbit may prevent States as well as other operators from entering without restrictions

The **slot geostationary allocation issue** is becoming of crucial importance given the increasing demand for positions in such orbit due to both its economic benefits and ongoing technological developments in many countries

## The allocation of geostationary slots

The organization responsible for the allocation of geostationary slots is the ITU.

#### ITU's Nature and Membership

ITU is a specialized Agency of the United Nations since 1947, established in 1865 and with a current membership of 193 Countries

#### ITU's Mandate

The ITU has progressively extended its activities together with technological developments in the telecommunication field. Currently, the Organization is mainly involved in satellite telecommunication matters. However, the ITU could play a role in regulating SPS satellites, that might cause interferences with satellites already in orbit

- The responsibility for managing radio-frequency spectrum and satellite orbital positions is committed to the **ITU Radiocommunication Sector**, whose key task is to ensure “the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including those using the geostationary-satellite or other satellite orbits.” **(Article 12.1 of the ITU Constitution)**

## The allocation of geostationary slots

The allocation issue can be solved through the rules provided by the ITU.

However, a **conflict** between the aim of equitable access to all States and the rational use of the geostationary orbit (GSO) due to its limited physical space comes to light.

Such conflict stems from **two discordant views**:

on one side, **developed Countries** want to facilitate the interests of those States that economically and technically are able to use the orbit only

on the other side, **developing Countries** uphold that even *non-space powers* should be put in condition to benefit GSO without any restrictions

Such conflict arises from the circumstance for which **developed Countries** – given their current and effective technical and economic capacity of positioning a satellite in orbit - *de facto* **enjoy a priority** to the detriment of developing Countries, which are yet not able to do it.

That priority, defined as *a posteriori* or *First-come, First-served* or *Coordination Procedure approach*, protects above all operators who first file a request and obtain the allocation of certain frequencies and positions in orbit. In fact, their registration remains effective until the launched system cease to operate, implying a slot use for an unlimited period of time.

**The allocation of geostationary slots**

Such situation is facilitated by the low costs for filings and by the fact that the coordination procedure does not contain a *Use it or lose it* provision.

**Two main consequences** have been identified:

- **firstly**, many operators, aware of the slot scarcity, file more requests than they need, bringing about the phenomenon of *Paper satellites*, so called because they exist only on paper and, hence, they are never used;
- **secondly**, some entities file applications with the aim not to put in operation a system but – in the absence of explicit prohibition – to sell or to lease the GSO positions rights previously acquired. Such use of the orbit, that would represent a *de facto* possession, would be in breach of both the non-appropriation and use of space for the common interest of all mankind principles laid down in the OST, and of the rationale of the ITU that aims at combining both equitable access and efficient use of orbits.

SPS: THE LEGAL ISSUES  
The allocation of geostationary slots

- To balance the above described situation, within the ***World Administrative Radio Conferences*** held in the **1980s**, in the ITU regime was included a series of plans in which **each Country was granted a certain position in orbit**. Such positions were put aside in order to allow the Countries - at that time unable to do that - to use them in the next future. As a consequence, **the *a posteriori* and *a priori* systems were combined**, so as to guarantee each Country equitable access to those resources.
- **By contrast**, this has led to a **non efficient use** of those resources, as some Countries not only left the position “empty”, due to their lack of technical and economical ability to use them, but also implemented slot trading and leasing practices.
- As it is based on orbits and frequencies resources planning, such procedure is called *Plan Procedure*.

## The allocation of geostationary slots

From this scenario an **uncertain legal framework** emerges. It is undeniable that such framework needs to be clarified through viable policy options and new or renewed existing regulatory mechanisms.

The uncertain legal framework is due to:

1. The **fragmentation of global space governance**, which affects also SPS



space activities are regulated by a number of general multilateral treaties which deal exclusively with outer space and space activities. Despite the adoption of these treaties and related conventions, however, key issues remain unresolved (e.g., the delimitation of outer space and the utilization of the geostationary orbit)

2. The existence of **different sources of law and bodies in regulating space activities** has led to a lack of coordination among different legislative bodies

### ➤ **The possible regulatory options**

SPS is based on an uncertain legal framework that requires to be defined through a revision of the ITU regulations or through international cooperation in order to set all the indispensable points both to attract investments to launch SPS project and to avoid possible conflicts between States

## SPS: THE LEGAL ISSUES

### The revision of the ITU regulations

#### 1. The revision of the ITU regulations

- How the current ITU regulations could be enhanced?

The geostationary slot allocation mechanism within Solar Power Satellites established by the ITU is widely accepted.

It is well-known as the ITU is committed to combining equitable access and efficient use of orbits. We need to take a **step forward** taking into account the outcomes reached so far.

The **possible solutions** to enhance the current ITU regime **should aim at:**

- ensuring equitable access to such scarce resources to each Country and prohibiting the *Paper satellite practices* diffusion;
- implementing mechanisms for a more efficient use of those resources, especially for those Countries that do not have technical and economical capabilities to use the position in orbit, so leaving it “empty”.
- Furthermore, selling and leasing of slots should be effectively prevented.

- ☐ The current access to geostationary orbit brings to mind the issues affecting the **airport slots allocation framework** before the implementation of Community liberalization policies between 1987 and 1992.

**The two systems share common issues.**

The revision of the ITU regulations

Geostationary slots

Airport slots

Common issues

As the number of space players, users and missions increase, the demand for appropriate radio spectrum and associated geostationary orbital slots is greater than the current supply, with the consequence that the competition for these limited resources becomes severe (Jakhu)

Regulation No. 95/93: there is a growing imbalance between the expansion of the air transport system in Europe and the availability of adequate airport infrastructure to meet that demand (first *whereas*). This has led to a lack of available slots, and to an unevenly spread of the benefits of liberalization and to a distortion of competition (twelfth *whereas* )

The European Union post-liberalization system has managed to combine the efficient use of slots through:

- the *use-it-or-lose-it* rule (Articles 8.2 and 10.4 of Regulation No. 95/93);
- the entry market of new entrant air carriers ensuring them a certain percentage of slots that may not be transferred nor exchanged before a certain period of time (Articles 8a, para. 3, and 10, para. 4, Regulation No. 95/93);
- a control over slot transfers and exchanges, that is carried out by national bodies (the s.c. slot coordinators) that answer directly to the member States that appoint them.
- The selling of slots is prohibited (Article 8a, paras. 1 and 2, Regulation No. 95/93).

### The revision of the ITU regulations

The EU airport slot allocation legal regime could be taken as a model to modify the ITU regulations currently in force, as an ***aedem ratio*** exists between the two systems, and this consists in allowing as much as possible the access to natural (scarce) resources: airport slots and geostationary slots.

For instance:

A ***use-it-or-lose-it*** rule could be envisaged

Geostationary slots could be allocated exclusively through **administrative/public procedures**, with the consequent express prohibitions to sell and/or lease them (including slots allocated to developing Countries).

Moreover, in order to avoid that the negative practice of slot selling occurring in the EU system continues, the ITU oversight powers could be enhanced or could be entrusted to other international or regional bodies (already tasked to that or to be establish for those purposes).

Therefore, after the ***a posteriori*** and ***a priori*** methods, time is ripe to take a further **step towards** the introduction of a system that allows the **rationalization of natural resources** at stake, a **more equitable distributions**, without ignoring their efficient use, given its nature of scarce resource.

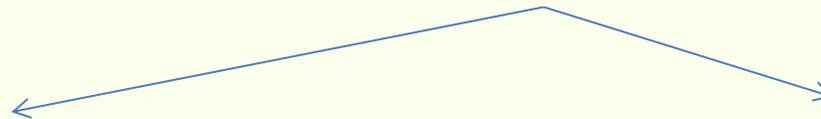
➤ Under an **organizational point of view**, this could be carried out through the **ITU** or through **other *ad hoc* international organizations** (even to establish), as well as through strengthening international cooperation between States.

## 2. International cooperation

The need of an international cooperation (in line with Article III of the OST ) is due to:

- the global or continental dimension of SPS;
- the significant financial resources are required;
- The need of keeping public control over involved entities (to ensure that general principles of space laws are respected).

Such partnership might be implemented either by international treaties or soft law means.



### Pros:

a new international treaty would lay down international obligations between contracting States, and could be more acceptable than other options by developing Countries, which tend to rely on international law as an instrument to achieve a more equitable space order

### Cons:

this option might face difficulties in reaching a genuine consensus on issues of economic importance.

Moreover, the lack of genuine consensus becomes particularly important where negotiated legal instrument require ratification

SPS: THE LEGAL ISSUES  
International cooperation

As a consequence, in the meanwhile, the second option (**soft law** means) seems more feasible and, despite it would momentarily be a (mere) non-binding political act of will, it might represent a valid legal base for a future international agreement within the United Nations umbrella.

**Organizational structure.**

The ITU has become a major forum for the development of international space law. Nevertheless,

it remains a technical body that deals only with the allocation of orbital positions for space communication

and its mandate does not allow it to regulate other possible uses of the geostationary orbit

- Therefore, **if no consensus will be reached to broaden the ITU mandate**, a new or already established specialized international organization might be, respectively, set up or found within the existing ones.

## CONCLUSIONS

- The current SPS legal framework might be enhanced, not only by ensuring equitable access to Geostationary Orbits to each Country and by banning the diffusion of *Paper satellite* practices, but also by making efficient the use of such resources, above all for those Countries that do not have technical and economic capabilities to use the position in orbit, so leaving it “empty”.
- Different regulatory options are possible, in particular new treaties and soft law tools. The first option seems to be desirable, but several obstacles make it not workable without certain conditions above said.
- Another possible (temporary) option would be the resort to soft law means (*i.e.*, non-binding political acts for a future international agreement) or the modification of the current ITU regulations, taking into account other experiences in regulating similar scarce resources, namely airport slots in the EU legal system.
- We believe that the geostationary slot allocation system might be revised through the introduction of new provisions, such as, inter alia, the *use-it-or-lose-it* rule, the exclusively public nature of the process for allocating geostationary slots, the codification of the prohibition to sell and/or lease such slots.

# THANK YOU FOR YOUR ATTENTION!

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