



Regulatory Risks for Small Satellite Operators

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Compared to traditional satellite operators, small operators often manufacture their own satellites, and design and produce their own ground equipment to provide connectivity directly to end users. While these developments have created business opportunities, they have also increased regulatory risks.

This article aims to highlight the main regulatory challenges of small satellites and provide a high-level overview of laws to help companies successfully navigate the regulatory environment and avoid pitfalls. The timeframe from designing satellite networks to providing services usually takes several years, and by identifying risks and mitigating them in a timely fashion – technical, commercial and regulatory – companies can get ahead of problems and ensure market access to their services by the time satellite(s) are fully operational.

The regulatory challenges faced by operators of small satellites have long been addressed by the industry. During the latest Satellite 2020 conference in Washington, DC several regulatory challenges were highlighted:

1. Ambiguous regulatory frameworks make it difficult for operators to identify if and to what extent regulations apply to them; there is particular ambiguity around what types of satellites are considered small and under what parameters;
2. Management of space debris is becoming more important as the number of objects in outer space increases;

3. Obligation to notify satellite networks with the ITU is an issue especially for small/medium sized companies;
4. Lack of harmonised approach to licensing and frequency authorisations from national authorities;
5. Type approval of end user equipment due to variety of requirements in different jurisdictions.

In this article we will examine these issues, alongside other regulatory challenges which are likely to affect network operation and access to foreign satellite markets. However, it is first important to distinguish between two different authorisation procedures, one regarding space and the other regarding ground segments as regulatory requirements for both significantly vary.

Authorising Space Segment

To understand the space segment authorisation process, one needs to know the difference between requirements based on national space law provided in United Nations conventions, as well as requirements based on telecommunication frameworks for the use of radio frequencies from the International Telecommunications Union (ITU).

UN Convention Authorisations

- a) The [Outer Space Treaty](#) sets out that activities of non-governmental entities in outer space must be authorised and supervised by the responsible state.
- b) The same treaty determines that the state launching an object and the territory from which it is launched could be liable for damages caused by the object (this is further elaborated in the [Space Liability Convention](#)).
- c) The [Registration Convention](#) requires the responsible state to provide information to the Secretary-General of the UN for entry in the UN Register of Objects Launched into Outer Space.¹ The state of registry retains jurisdiction and control over objects.

Countries enact national legislation to ensure their activities are aligned with international space law. For example, the UK has adopted an [Outer Space Act](#) which provides an authorisation framework for space activities. It includes the registration of objects and imposes indemnification obligations against any claims to the UK government in relation to activities conducted by any person under the Act.

Entities that want to launch objects into space must know which state is responsible for authorisation and registration, as well as implement space debris mitigation measures when manufacturing and operating satellites. The UN General Assembly has provided best practices for this in its [Resolution 62/217](#). The implementation of space debris measurements is a strict requirement by national authorities for authorising the launch of a satellite.

Finally, it should be highlighted that international space law does not define what an “object” or “outer space” are. However, outer space is generally considered to be 100 km above sea level, and an object is considered to be a human-made object sent into space.² Therefore, even small low-Earth orbiting

¹ It should be noted, however, that even if the obligation to register is with the launching state, the Registration Convention leaves certain ambiguity in terms of which state could be qualified as a registration state in case there are two or more states involved, when for example one state procures the launching of a space object which is then launched from another state’s territory. In such cases, states shall jointly determine which one of them shall register a space object.

² For further discussion on the definition of outer space and space object please see Frans von der Dunk, International space law, Handbook of Space Law edited by Frans von der Dunk and Fabio Tronchetti pages 29-126.

satellites can be considered to be an object in outer space and thus those that launch them must also comply with international and national requirements of space law.

ITU Regulatory Framework

All satellite networks are subject to the ITU filing and notification process in order to coordinate the interference free use of frequencies among operators. This process is separate from the space law authorisation.

The ITU Constitution, Convention and Radio Regulations do not define small satellites either. The Radio Regulations only make a distinction between GSO and non-GSO satellites. One ITU [report](#) did define small satellites by weight, power, location, and dimension. The Federal Communications Commission has recently published [Rules on small satellites](#) which also make a distinction between different types of small satellites based on their technical characteristics, which similarly include weight, location, and dimensions.

The ITU filing process depends on whether satellite coordination is required. If it is not, then only Advance Publication Information (API) must be submitted to the ITU, and if it is, a request for coordination must be submitted first. Additionally, the satellite operator does not communicate with the ITU, it is done by the country which is responsible for the ITU filing process. To begin this process, satellite operators need to request that their national administration initiate the process.

In the UK for example, OFCOM is responsible for authorising satellite networks and has its own filing submission [guidelines](#). Each national authority may have a slightly different regulatory framework, making it difficult for smaller companies to stay on top of the process.

Finally, it should be noted that Satellites in NGSOs are subject to less burdensome requirements than satellites in GSO. Satellite coordination is not required for small satellites using certain frequencies in NGSOs, which significantly simplifies the ITU filing process. If satellite coordination is not required, then API must be filed with the ITU about one year prior to using frequencies, and if satellite coordination is required, the process can be extended to a maximum of seven years. In both cases, satellite operators have a maximum of seven years to start using frequencies after their applications are submitted to the ITU.

Authorising Ground Segment

There are different regulatory obligations for operators wanting to only provide bandwidth as wholesalers to entities operating their own ground networks who deliver services to their own end users; and operators who operate their own ground networks and deliver connectivity directly to end users.

Satellite Landing Rights

Some jurisdictions (including the US and some APAC countries) still require a market access authorisation for foreign satellites to radiate signal over their territory. Operators obtain and pay for this authorisation, also known as satellite landing rights, from national authorities. This was initially enforced to protect domestic satellite companies from foreign competition and to ensure that domestic operators have the same access to providing satellite signal over foreign jurisdictions and vice versa.

Frequency Licensing

The use of frequencies generally requires a licence from the national telecommunications authority who assign frequencies. Depending on the type of frequencies and under what parameters they are used, it is also possible to use frequencies without a licence or to apply for a blanket/network authorisation which allows for the operation of an unlimited number of terminals within a certain territory. This is possible if planned frequencies have been allocated on a primary basis and do not interfere with frequencies in other services. If the interference free use of frequencies is not possible, each Earth station must be separately coordinated and will need an individual licence.

Frequency licensing can also be problematic for small satellite operators as the frequencies they commonly use, the VHF and UHF bands, are often unfamiliar to national authorities compared to ranges in the L, S, C, Ku and Ka bands.

Additionally, if a satellite operator does not operate a satellite ground network to provide connectivity to end users, but still operates its Telemetry, Tracking and Command (TT&C) in a specific country, it would very likely require a separate frequency licence. These frequencies would also likely be coordinated with other frequencies during bilateral coordination as part of the ITU process.

Telecommunication Licensing

While a telecommunications licence is generally needed to provide telecommunication services in a country, it might not be required if a satellite operator only provides bandwidth as a wholesaler. There are, however, certain jurisdictions which do require wholesalers to have a licence. Additionally, if an operator provides TT&C services to a third party it could also require a telecommunications licence.

If an operator directly provides connectivity to end users, a telecommunication licence will be required, and it may need to establish a local company,³ as well as pay regulatory fees. Being subject to a telecommunication licence also implies having certain rights. For example, the right to apply for spectrum or numbering resources. However, it also includes obligations such as ensuring lawful intercept and the security of its network, as well as complying with other requirements. Some national regulatory frameworks, however, distinguish between the provision of services to the public and to closed user groups and there are cases where it can be argued that a telecommunications licence does not apply.

Type Approval

Another challenge for small satellite operators is obtaining type approval of end user equipment due to the variety of requirements in different jurisdictions. While type approval is normally the responsibility of the manufacturer, importer or distributor, it is recommended that satellite operators verify that end user equipment is compliant with the necessary requirements. If equipment does not comply, then it is not allowed to be placed on the market, and the use of frequencies will also not be allowed.

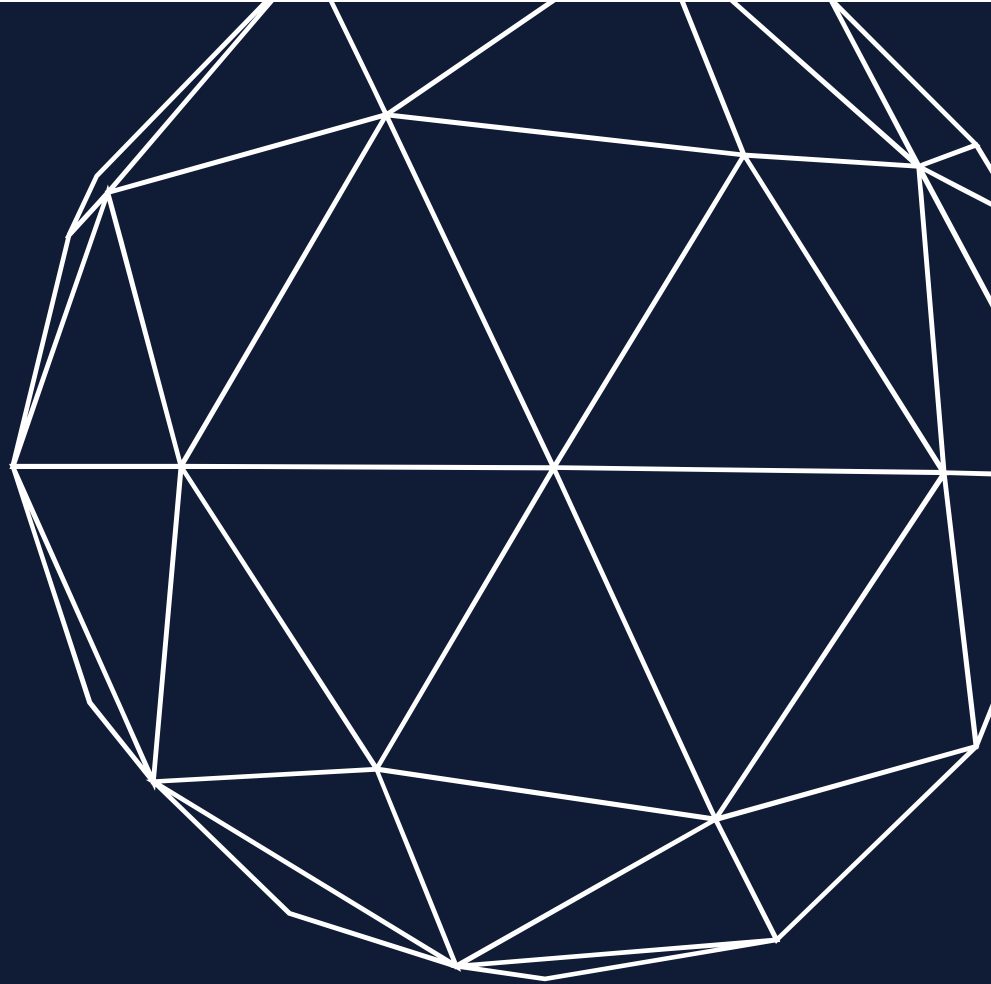
If a satellite operator designs equipment itself, it needs to ensure it meets the minimum standards. Many countries accept ETSI standards for radio equipment, however, these may be different from FCC standards in the US or other jurisdiction's standards. It is therefore important when designing radio equipment that it complies with the minimum requirements of the

³ With possible exception of the European Union where if a company is registered in one of the EU member states, it does not require registration in other member states.

jurisdictions it will be used in so that the operator can self-certify equipment or receive a certificate of type approval. If planned equipment does not comply with standards, the manufacturer will have to draft new standards and have them approved by authorities, a process that may take several years.

Conclusion

The space segment authorisation requirements for small satellite operators in NGSOs are similar to operators in GSOs. However, the coordination of satellites with the ITU for certain types of frequencies in NGSOs will not require coordination. This significantly accelerates the authorisation process and decreases the regulatory timeframe and fees. If an operator decides to provide connectivity to end users and not only satellite bandwidth to retailers, it needs to ensure it has the relevant licence or exemption to use frequencies and a telecommunications licence to provide connectivity to end users. Additionally, if an operator places radio equipment on the market it must be compliant with relevant type approval requirements.



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