

# The Authorization and Licensing of Small Satellite Missions

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# About Me



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# Article VI of the Outer Space Treaty

States Parties to the Treaty shall bear **international responsibility for national activities** in outer space... whether such activities are carried on **by governmental agencies or by non-governmental entities**, and for assuring that national activities are carried out in conformity with the provisions [of this] Treaty. The activities of non-governmental entities in outer space... shall require **authorization and continuing supervision** by the appropriate State Party to the Treaty. ...

# History of Article VI

- USSR: “all activities shall be carried out **solely** and **exclusively** by States”
- USA: **private entities** have rights in outer space
- UK: “all States shall, **for themselves and for their nationals**, have equal rights in the exploration and use of outer space”
- USA: “a State from whose territory or with whose assistance or permission a space vehicle launches bears **international responsibility** for the launching and is internationally liable”
- USSR: international responsibility (whether by governmental or non-governmental entity) and will require **authorization/supervision**

# International Responsibility

- Treaty of Westphalia, 1648
- International Law
  - State-centric Model
  - Sovereignty and Equality
- International Responsibility (and Liability)
  - Violations of International Law
  - Public and Private Entities
    - General International Law vs Space Law

# National Legislation

- Argentina
- Australia
- Austria
- Belgium
- Brazil
- **Canada**
- Chile
- China
- France
- Germany
- Japan
- Kazakhstan
- Netherlands
- Norway
- Republic of Korea
- Russia
- South Africa
- Spain
- Sweden
- Ukraine
- United Kingdom
- **United States of America**

# Authorization

- What? Laws that apply to “national space activities”
- Who? All nationals (people, corporations, partnerships, universities, etc.) regardless of geographic location
- Where? All people within a State’s borders, regardless of nationality
- When? For as long as space operations exist and it remains a national activity of that State
- Why? To give States better control over national activities in outer space in order to reduce their exposure of responsibility/liability
- How? By requiring entities wanting to engaging in space activities to go through an application and licensing process dictated by a government agency



# Authorization in Canada

Radiocommunication Act – Industry, Science and Economic Development

- Canadian **citizen**, Canadian/provincial corporation/partnership/government
- **First come, first served** (electronic applications determine order)
- **45 days** from application to license (exceptions apply, especially if complex system)
- **5 years** from license to implementation (with standard milestones)
- Licence allows licensee to operate satellite system for **15 years**
- Things to Include
  - Orbital altitude/characteristics
  - **Number of satellites** to be launched
  - Description of satellite operations and control facilities (including geographic location)
  - Debris Mitigation
    - Geostationary Satellites: **ITU compliant** deorbiting plan
    - Non-geostationary satellites: industry **best practices** (consider UN DMG)

# Authorization in the USA

## Title 47: Telecommunications, Part 25: Satellite Communications – Code of Federal Regulations

- Before sending anything to space, you need a **station licence** from the FCC
  - If you have already acquired a **blanket licence**, however, you may deploy and operate technically identical replacements without additional authorization (but you must still provide notification after replacing)
- Must include how the design/operation of the system will **mitigate debris**
  - Applications for satellites that **cannot maintain their orbital tolerance** (no propulsion) must make this clear
- Licence is granted for **15 years** – term starts on day first satellite is operational (can be renewed)
- Milestones (dates by which certain pre-operation events should occurred) have been removed
  - For GSO and non-GSO systems, you now have **five and six years**, respectively, **from license to begin operation**
- Must provide a **surety bond** – approximately \$1,000,000 plus \$400,000 per year until you launch
  - If your system isn't operable after 5 or 6 years (depending on the type), you default on your surety bond
- An applicant can only submit **one application per frequency band**
  - This extends to any entities in which they have greater than 33% equity
- For certain activities (such as broadcasting), you must provide service to all 50 states

# Supervision

- **Objective:** to ensure that the activity licensed in the authorization process is actually being carried out within the limits of the licence
- **Methodology:**
  - Annual Reports
  - Applications to Amend Licence Permissions or Conditions
  - Notifications of Failure/Compromise or Change in Control/Ownership
  - On-Site Inspections of Facilities and Investigations
  - Compliance with the Registration Convention
  - Suspension/Revocation of Licence and/or Penalties
- **Rationale:** to mitigate the potential international responsibility that is associated with space activities

# Supervision in Canada

## Radiocommunications Act

- Licensees are required to immediately inform Industry Canada of any changes to their **contact information** or to information concerning their **satellite operations and/or control facilities**.
- Licensees are required to provide an **annual report** informing ISED of their continued compliance with the conditions of licence.
- Licensees are required to report any **suspension of service** to ISED.
- Where licensees intend to **modify** their use of assigned **spectrum** for the operation of their satellite(s) in a manner that is inconsistent with the authorized or approved parameters of the licence, licensees must **request an amendment** to their licence in advance of implementing the modification.
- Licences may be revoked or withdrawn on the basis of failing to meet **milestones, violating** conditions of the licence or **changes in public policy**.
  - If because of a change in policy, licensees are normally provided a transition period before forfeiting their licences.

# Supervision in the USA

- Annual Reports
  - Provide a list of up-to-date **emergency contacts**
  - Identify any space stations that are **no longer working**
  - Identify any **spectrum** the space station is **unable to use**
  - Provide construction progress and launch dates for any authorized replacement satellites

# Small Satellites and Regulatory Regimes

- How do smallsats fit into existing regulatory regimes?
  - Everything that applies to traditional satellites applies to smallsats
    - In most cases, a space object is a **space object regardless of size or function**
  - They must follow the exact **same authorization** process to receive a licence and undergo the **same supervision** requirements as other satellites
  - This applies **regardless** of whether a satellite is for scientific, experimental or commercial activities
- When might small satellites fall outside the existing regulatory regime?
  - If the **definition** of satellite requires propulsion, guidance, manoeuverability, etc. some smallsats may not apply

# Streamlining Authorization

- How can we streamline the authorization process?
  - Language
  - Classifications of Capability
  - Applications
  - Easier Upgrades of Constellations
- What benefits would this bring?
  - Increased **development** of smallsats
  - **Diversification** in use of smallsats
- What potential consequences would follow?
  - Potential **safety or security** issues not being identified
  - More space objects in orbit (which may not have active deorbiting mechanisms)
  - Potential radio frequency **congestion**

# Streamlining Regulatory Language

- Making the regulations **comprehensible** is extremely important
  - Most are drafted in dense **legalese** as well as including **technical specifications** that can be intimidating
- Remember your **audience**
  - Not everyone is a lawyer and not every entity can afford a lawyer
- If you are a small company or a university that wants to send a small payload to orbit, you may not have the **resources** to hire lawyers or legal professionals
  - Considering one of the advantages of small satellites are their low cost, it defeats the purpose if the application itself removes this benefit
- Making the language of these regulations **straightforward** would mean that you may not need a lawyer to fill out the forms
  - One way of doing this can be through **Client Information Circulars**



# Function Over Form

Should small satellites be regulated the same way as large satellites?

- For governments, the purpose of national legislation is to **protect their interests**
  - International responsibility, public policy, national security, protecting industry, etc.)
- Therefore the question is not “small or traditional satellite” but rather **capability**
- It is more the **function** of a satellite than its **form** that concerns States
  - Whether your satellite is the **size of a bus or a cellphone** matters less than whether your satellite takes **low-res or high-res pictures**
- In authorizing satellites, we should look to capabilities and interests
  - **Scientific** satellites that measure the atmosphere may fall into one category
  - **Experimental** satellites that test new encryption methods may fall into another category
  - **Commercial** remote sensing satellites may fall into yet another

# Increasing Supervision

- If the authorization process for low-capability satellites is streamlined, it is expected there will be an **increase in satellite operation**
- With the increase in use, there ought to be a corresponding **increase in supervision**:
  - Increasing reporting requirements
  - Spot-checking adherence to licence conditions
- Conducted through a Department of Space
  - Conducts **supervisory** duties (and space traffic management/space situational awareness in the future)
  - Potentially **inherits authorization** process from FCC in the future

# “Harnessing the Small Satellite Revolution”

- A number of important announcements but the one particularly important to this presentation was the line that stated:
  - **NASA** will establish a Small Spacecraft Virtual Institute [that] will also act within the agency to promote relevant programs, guidance, opportunities, and best practices, as well as share lessons learned on smallsat missions. To take full advantage of the rapid iteration cycles associated with smallsats, **NASA is also working to standardize its management practices associated with smallsat missions to reduce the administrative burdens associated with them** in comparison to larger, more traditional space missions.
  - The **Department of Commerce** is elevating the role of the Office of Space Commerce to reflect the growing importance of commercial space as a driver of economic growth, productivity, and job creation. **This will enable the Office’s Director to advise the Secretary of Commerce on commercial space issues and the office to coordinate policy on critical issues such as licensing, export controls, export promotion, and open data.** The Director’s statutory role is to act as an advocate and ombudsman for the commercial space industry within the Federal government...

# Questions