



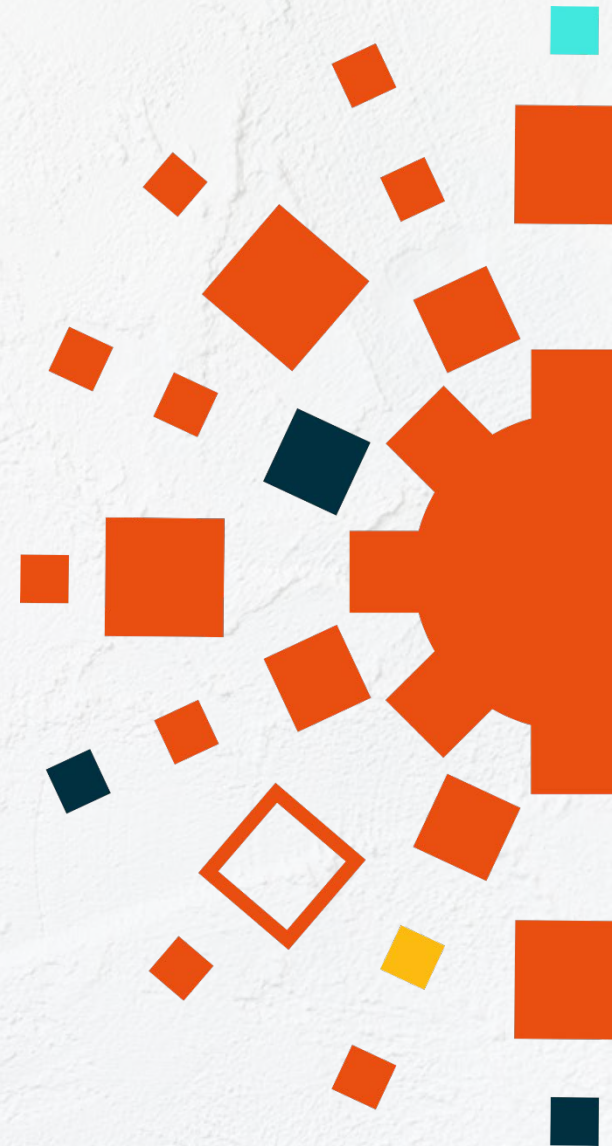
AIRD McBURNEY

# Patent Rights in Space – Down-to-Earth Tips for Spacefaring Innovators

**Date: March 14, 2025**

Jérôme Lafrenière, Patent Agent, Director of IP, NGen

Jay Millman, Patent Agent, Partner, Aird & McBurney





# NGen

**NGen is Canada's Global Innovation Cluster for advanced manufacturing - committed to building world-leading advanced manufacturing capabilities for the benefit of Canadians.**



## Ecosystem initiatives

- Resources for leadership teams
- Training and upskilling for workforce



## Cluster acceleration program

- ~ 35 clusters country-wide
- Geared toward developing member-accessible industry and/or region-specific technical resources



## Project funding programs

- Projects led by consortia of Canadian companies
- At least 1 SME per consortium
- Reimbursement of ~ 1/3 of eligible expenses





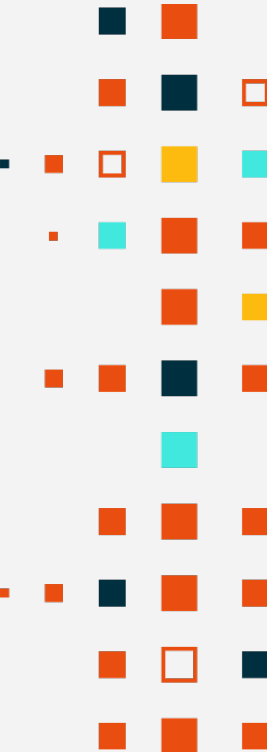
# M4M3:

## Moonshot for Mining, Minerals and Manufacturing

- ❖ The **commercial space industry** is expected to grow from \$390 billion as of 2022 to **\$1.4 trillion by 2040**.  
(Bloomberg, 2022)
- ❖ “*The **cis-lunar supply chain for resources** is still firmly in its **infancy**, however, **competing nations** are already mobilizing to **secure their interests**.*”  
“In-Situ Resource Utilization – A generational opportunity for Canada”, Canadian Space Mining Corporation, 2023 ([LINK](#))
- ❖ **NGen** launched the **M4M3 program**, co-funded by:  
**Canadian Space Agency** and  
**Innovation, Science and Economic Development Canada**
  - Intended to promote the development of technology related to *in situ* resource utilization (ISRU) and applicable on both the Earth and the Moon
  - 6 projects involving a total of 12 companies
- ❖ **High levels of innovation, cost of entry, potential profits and competition → Patents**
- ❖ Patents are strictly territorial... ***or are they?***

# Table of Contents

1. Reasons for Securing IP
2. Relevant Basics of IP Law
3. Important Aspects of Treaties Relating to Outer Space
4. The Law in Common Launch Jurisdictions
5. Detecting/Asserting Infringement
6. Strategies for Securing IP for Space-Related Inventions
7. Examples – Additive Manufacturing in Outer Space, Earth Space-Communication
8. Conclusions
9. Q&A





# Why secure IP



## DETERRENCE

Most companies do not want to knowingly infringe IP rights of others.



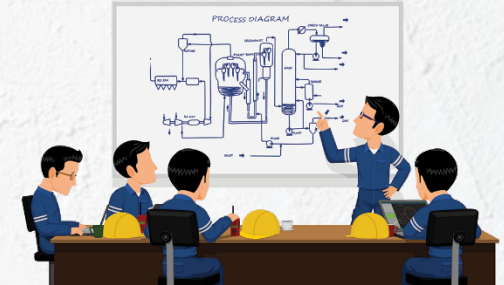
## VALUATION

Investors and buyers alike sometimes place a great deal of importance on the IP.



## BARGAINING

This comes into play in particular when you infringe on the IP rights of others but also have IP rights that they need.



## CANNOT DISCLOSE INVENTION

You need to discuss the core aspect of the invention in order to properly sell your system/device. Without IP you cannot disclose without concern that the invention will be taken or shared.

## NO OTHER RECOURSE

Ultimately if you do not have IP rights, you have no way of stopping a competitor from taking advantage of the R&D work you have done.



# Relevant Basics of Patent Law

## 1. What Is a Patent

Agreement with the government – inventor discloses invention, is given protection against others practicing invention for fixed period of time

## 2. Structure of Patent

Description, Drawings, Claims

## 3. Territoriality of Protection

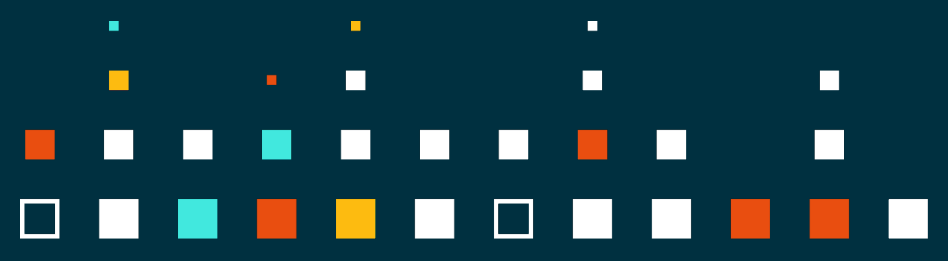
Must secure protection in each country  
No worldwide patent  
Some regional patents – European Unitary Patent

## 4. Categories of invention

Apparatus, composition  
Method of making  
Method of using  
Software-based inventions – typically requires special way of claiming to be granted, differs by jurisdiction

## 5. Activities Protected by Patent

Make, Use, Sell are the protected activities  
Importing – prevented in some jurisdictions  
permitted in some  
Temporary passage - permitted in most jurisdictions



# Treaties Relating to Outer Space

## The “Five”:

1. Registration Convention
2. Outer Space Treaty
3. Liability Convention
4. Rescue Agreement
5. Moon Treaty

These treaties are published in in [International Space Law: United Nations Instruments \(2017\)](#)

**Also of note:** Space Station Agreement



# Registration Convention

Formally: Convention on Registration of Objects Launched into Outer Space of 14 January 1975

## Article 1

Definitions:

"launching State" means:

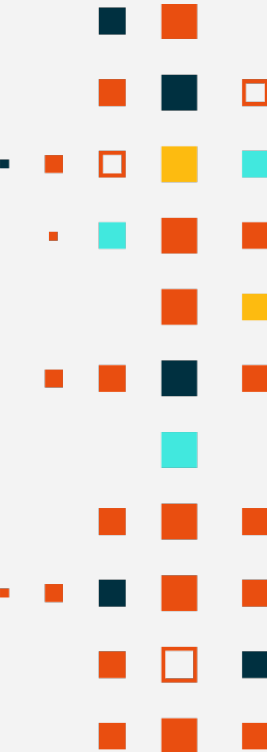
- (i) A State which launches or procures the launching of a space object
- (ii) A State from whose territory or facility a space object is launched

"space object" includes component parts of a space object as well as its launch vehicle and parts thereof;

"State of registry" means a launching State on whose registry a space object is carried

## Article 2

1. When a space object is launched, the launching State shall register the space object on its registry.
2. If there are two or more launching States for a space object, they jointly determine which one of them shall register the object on its registry.





# Outer Space Treaty

Formally: Treaty on principles governing the activities of States in the Exploration and Use of an Outer Space, including the Moon and other Celestial Bodies of 27 January 1967

## Article VIII

The country that registers the space object retains jurisdiction and control over the space object and any personnel thereof, while it is in outer space.

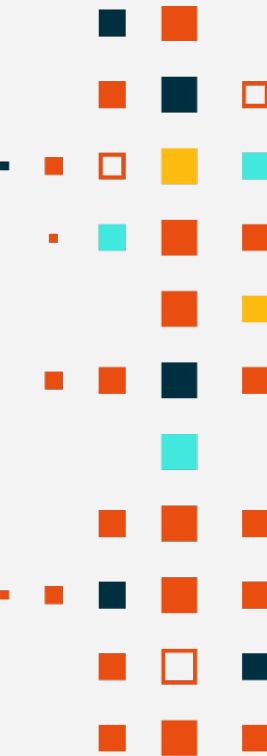
# Liability Convention

Formally: Convention on International Liability for Damage Caused by Space Objects of 29 March 1972

## Articles II and V

A launching State or launching States is/are liable for damage caused by its space object on the surface of the earth or to aircraft in flight.

Treaty has no real impact with respect to IP.



# Rescue Agreement

Formally: Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into an Outer Space of 22 April 1968

## Key Point

Contracting parties must immediately notify the launching authority upon discovery that the personnel of a spacecraft are in distress or have had to make an emergency or unintentional landing in their territory or in high seas.

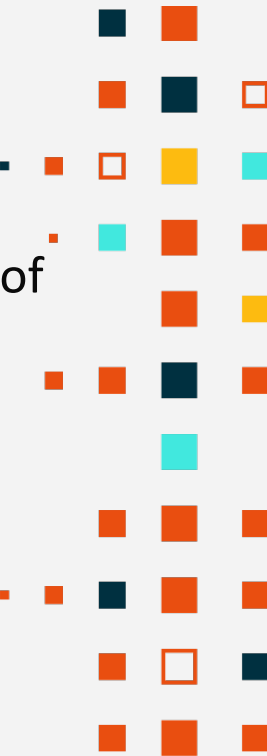
Treaty has no real impact with respect to IP.

# Moon Treaty

Formally: Agreement Governing the Activities of States on the Moon and Other Celestial Bodies of 18 December 1979

## Article 12

(1). States Parties shall retain jurisdiction and control over their personnel, vehicles, equipment, facilities, stations and installations on the Moon. The ownership of space vehicles, equipment, facilities, stations and installations shall not be affected by their presence on the Moon.





# International Space Station Intergovernmental Agreement

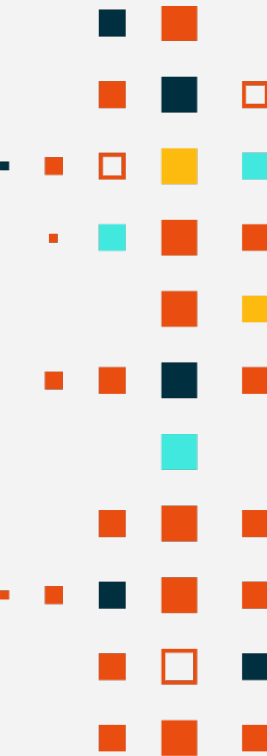
Formally: Agreement among the Government of Canada, Governments of member states of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America concerning cooperation on the civil international space station

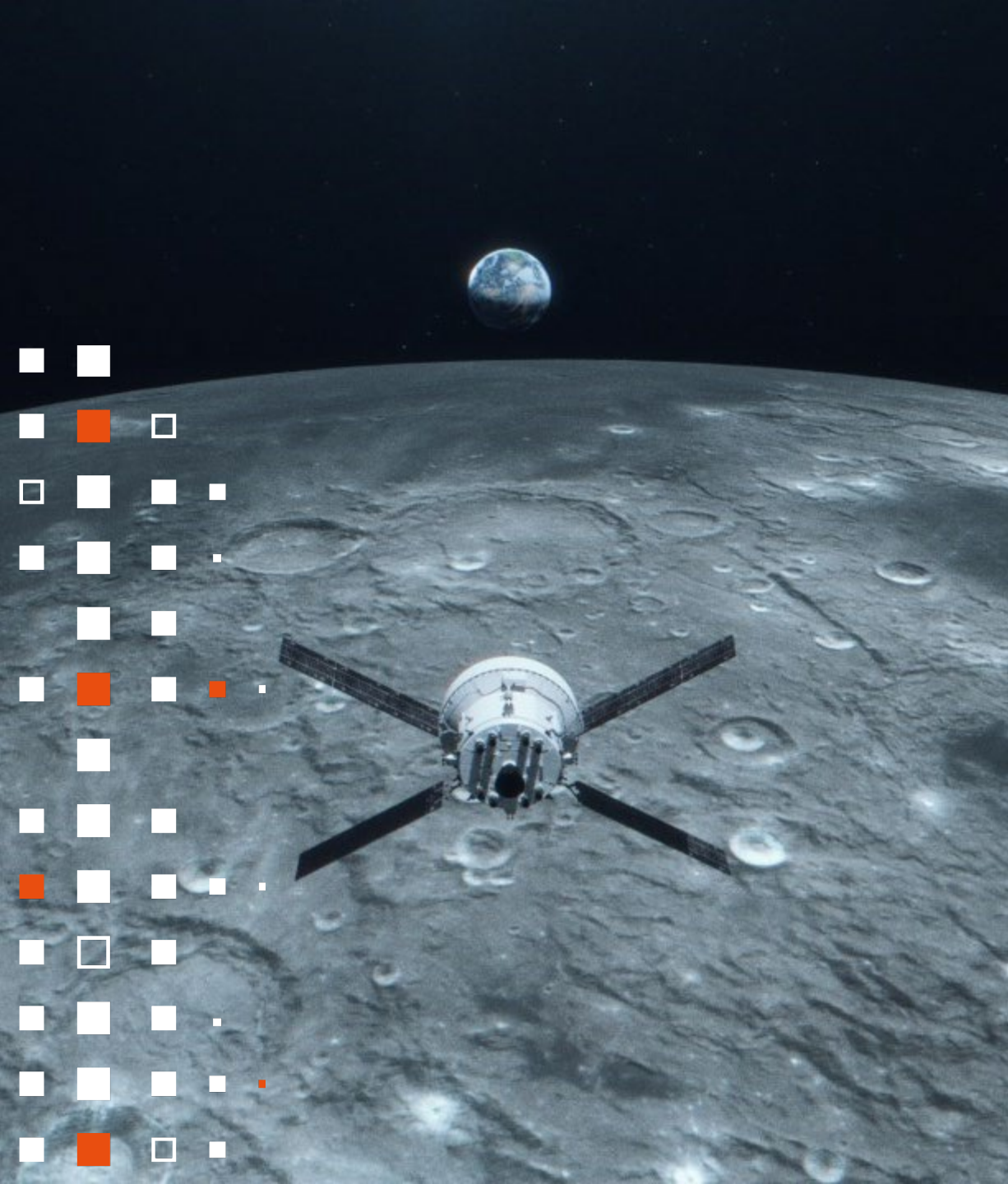
## Article 21

Article 21 relates to IP.

An activity that occurs on an element of the ISS is deemed to have taken place in the State of Registry for that element.

The temporary presence of any articles in transit from anywhere on Earth and any element of the ISS will not be considered patent infringement.





# What is a Space Object

## Definition

No specific definition is provided in any of the five Treaties, but “space object(s)” and “object(s) launched into outer space” are used interchangeably.

No consensus on where outer space begins. Nasa: 50 miles above sea level, other countries: 100 km. Even the definition of the Kármán line is not agreed upon.

According to the Registration Convention, a space object includes component parts of a space object, and its launch vehicle and parts thereof.

## Registrant

Registrant is the launching State, or one of the launching States.

## Registration Resources

Online index of objects launched into outer space maintained by UNOOSA: [Search OSOidx](#)

Other registration-related resources by UNOOSA: [Resources on space object registration](#)



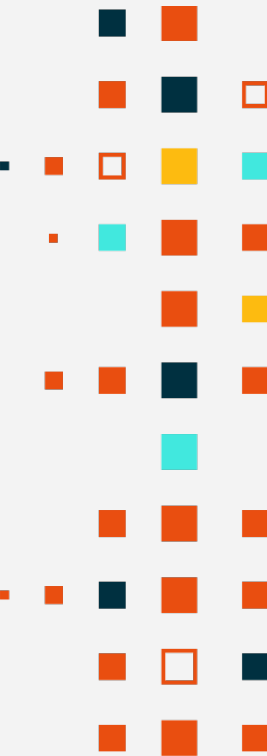
# Registration - Example

**Canadian company builds satellite and procures the services of SpaceX to launch from the US**

Canada and the US both qualify as launching States for the satellite, since the Canadian company procured the launch service for it, and the satellite is being launched from the US. The same is true for the booster.

The US will not want responsibility for the satellite, and Canada will not want responsibility for the booster.

Likely, the satellite will be registered in Canada, and the booster will be registered in the US.



# Common Launch Points

## United States

Party to all treaties except Moon Treaty

Patent law states that a space object registered in US is considered US territory for patents - 35 USC 105

Old case law also supported this concept

Ex Parte McKay – Related to process of obtaining oxygen from extra-terrestrial materials. Appeals Board stated that Article VIII of the OST means that a space object on the US registry is under the jurisdiction of the US with respect to patents.

Decca Ltd. Vs. United States – navigation system. The court concluded that the US patent was infringed because the ships and aircraft which received signals were registered to the US and therefore constituted territory of the US.

Importing patented invention constitutes infringement (35 USC 271)

Temporary presence not considered infringement – based on reciprocal rights (35 USC 272)

## Europe


Many EU countries party to all treaties except Moon Treaty (France signatory to MT)

ESA accedes to RC, LC, RA, effectively OST

Patent law is applicable in Germany in relation to ESA-registered elements on ISS

Importing patented invention is infringement (under the CPC)

Temporary presence not considered infringement



On June 21, 2016, at 11:56 p.m. (EDT), the Canadian Maritime Monitoring and Messaging Microsatellite (M3MSat) was launched successfully from Sriharikota, India. M3MSat will advance Canada's capabilities to monitor maritime traffic from space. (Credit: [ISRO](#))



# Common Launch Points

## Russia

Party to all treaties except Moon Treaty

Patent law not explicitly applicable to space objects

Importing patented product does not constitute infringement

Temporary passage not considered infringement – based on reciprocal rights

## China

Party to all treaties except Moon Treaty

Patent law not explicitly applicable

Importing patented product does not constitute infringement

Temporary passage not considered infringement – based on treaty or reciprocal rights


## New Zealand

Party to all treaties except Moon Treaty

Patent law not explicitly applicable

Importing patented product does not constitute infringement

Temporary passage not considered infringement



On June 21, 2016, at 11:56 p.m. (EDT), the Canadian Maritime Monitoring and Messaging Microsatellite (M3MSat) was launched successfully from Sriharikota, India. M3MSat will advance Canada's capabilities to monitor maritime traffic from space. (Credit: [ISRO](#))



# Common Launch Points

## Japan

Party to all treaties except Moon Treaty

Patent law not explicitly applicable

Importing patented product does not constitute infringement

Temporary passage not considered infringement


## India

Party to all treaties except Moon Treaty (signatory to MT)

Patent law not explicitly applicable

Importing patented product does not constitute infringement

Temporary passage not considered infringement



On June 21, 2016, at 11:56 p.m. (EDT), the Canadian Maritime Monitoring and Messaging Microsatellite (M3MSat) was launched successfully from Sriharikota, India. M3MSat will advance Canada's capabilities to monitor maritime traffic from space. (Credit: [ISRO](#))

# Where do patent rights apply?

## The patent law of a given state applies:

- ❖ On Earth (!) and in the airspace within the territorial borders of that state.
- ❖ Onboard space objects, including the ISS (remember that each module/flight element is an individual space object registered by a specific state) registered by that state.
  - Only the US has enacted this so far, but others will likely follow suit
- ❖ Onboard vehicles and equipment, and inside facilities, stations and installations on the Moon\* and under the control of that state.
  - \*Provisions related to the Moon also apply to Mars and other celestial bodies of the solar system
- ❖ However, to our knowledge, no patent infringement claim has yet been brought to a court anywhere in the world for infringement having occurred in space, and Space Law is evolving.
- ❖ As such, freedom to operate assessment and patenting efforts should be focused on what happens on/from Earth.



# Issues Relating to Enforcement of IP

## Detecting/Asserting Infringement

- Strict detection is not necessary
- However, you will need to provide the court with some detail in the complaint to make a plausible (not probable) claim for relief. This means that you may need to show how the infringing product/process maps onto the claim elements, or why you believe they do.
- It is no longer sufficient to simply assert that the infringer's product infringes your patents, or to identify each claim element and simply assert that the infringer's product contains that claim element. You must show where/how it contains that claim element.

# Strategies for Securing Space-related IP

## 1. Apparatus/Composition Claims

- These are claims that are infringed by the object itself, without requiring use
- These claims are infringed on Earth
- These claims are generally easier to detect infringement thereof

## 2. Method of Manufacture Claims

- These are claims to the process on Earth used to make a device that may be used in outer space
- These are not intended to be claims to a process of manufacture that requires a presence in outer space
- These claims are infringed on Earth

## 3. Method of Use Claims

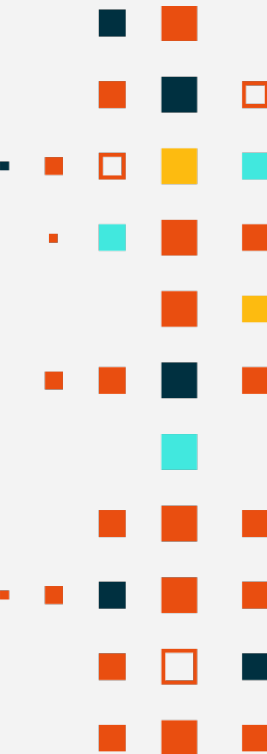
- These can be the most difficult, as you may have to navigate Temporary Passage laws, and the uncertainty of whether IP laws transfer to space objects
- Keep in mind that Temporary Passage laws cover vessels registered to a different country than the one the vessel is passing through

## 4. Claims to Secondary Use

- These are claims to the device as configured for a secondary use here on Earth (e.g. in aircraft)
- As a result, this would be infringed on Earth
- These claims are generally easier to detect infringement thereof
- Separate from the benefit of protecting the secondary use market for you, if you prevent a competitor from being able to monetize an invention via the secondary use, they may not be able to justify the investment to make it for its primary use in outer space

## 5. Strategic Territorial Coverage – coverage in jurisdictions that are:

- most likely to manufacture the technology (make)
- most likely to be the State of registry during the use (use)
- your strongest markets for the technology (sell)





# Example 1 – Additive Manufacturing in Outer Space





# Example 1 – AM in Outer Space

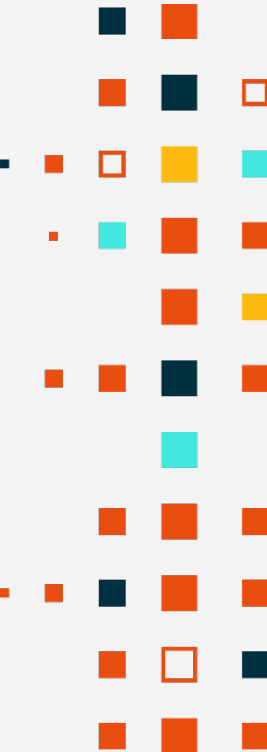
**A company develops an additive manufacturing process that is used to produce replacement parts on a space station**

Several approaches to protect it:

The device that carries out the AM process may include physical features that were innovative in order to carry out the process. Pursue apparatus claims to capture these aspects of the device. These claims would be infringed on Earth and are easier to enforce.

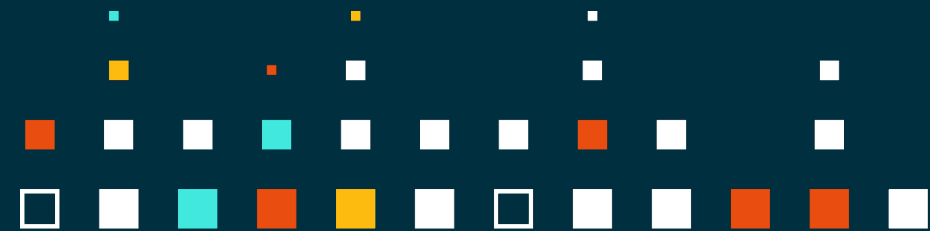
The control system for the device that carries out the AM process may need to have certain features to permit the device to be usable to make the various different parts it will have to be able to make, and to operate in microgravity. Pursue apparatus claims focused on the control system for the device. These claims would be infringed on Earth and are easier to enforce.

You can also pursue claims to the novel AM process, and/or to the final product produced by the process, which may have properties as a result of the novel process. These claims would be infringed in outer space however. You would therefore want to focus on the States of registry of whatever entities would build elements for a space station. These claims may be more difficult to enforce, particularly if the element of the space station in which the device is located is registered to a country other than the US.





# Example 2 – Earth-Space Communication



# Example 2 – Earth-Space Communication

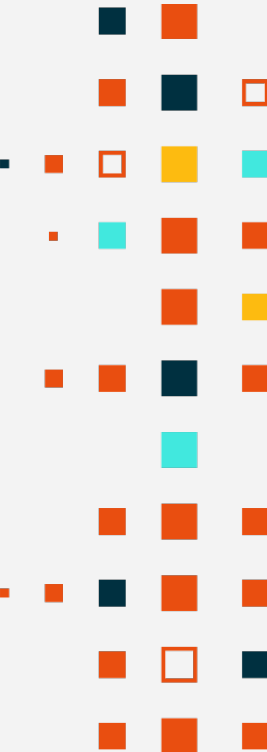
**A company develops a communication system that is used to communicate at higher data rates between ground-based stations and an orbiting satellite**

Several approaches to protect it:

There may be physical aspects of the ground-based stations or aspects of the control system for the ground-based stations that are novel and which are needed in order to permit the communication with the satellite to take place. You can pursue claims to those aspects. These claims will be infringed on Earth and are easier to enforce.

There is a likelihood that the ground-based stations will be located in the same country that the satellite is registered to. You can therefore pursue claims to the overall system, on the premise that the entire infringement will be considered to take place within a single jurisdiction – an analogous situation to the Decca case. This is especially true if the jurisdiction is the US, making such claims easier to enforce.

You can also pursue claims to any aspects of the satellite design or control system that are novel and which permit the communication to take place. These claims will be infringed in outer space however, and will be more difficult to enforce, particularly if the satellite is registered to a country other than the US.





# Conclusion

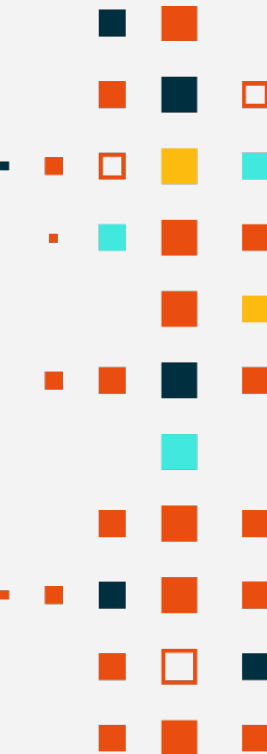
Much of the legal framework around patent rights in relation to space objects is unclear, varies country to country, and is evolving.

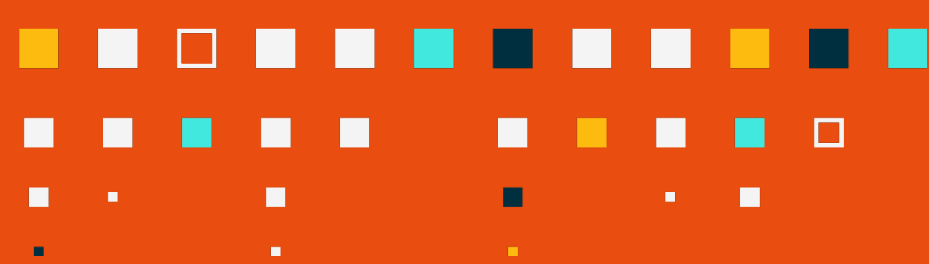
The US has the most advanced law in respect of facilitating enforcement of patent rights in space, namely on space objects.

Be mindful of which space objects – and hence the territory of their State of registration - your technology might be deployed onto.

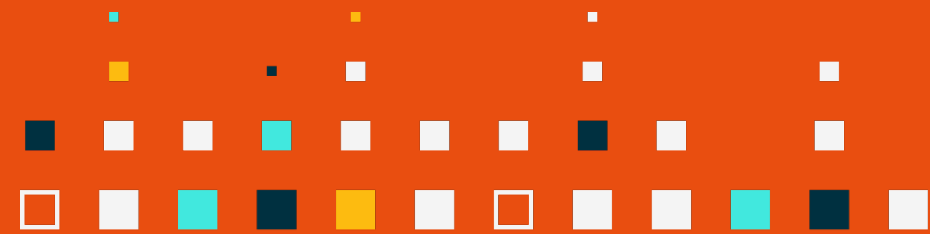
Focus on infringement before reaching outer space, or after returning to Earth.

Each situation should be reviewed on an individual basis to determine the strategy for protecting the technology. In many cases, there is a way forward to secure and enforce patent rights.





# Q&A



# Contact



**Jérôme Lafrenière**

**Patent Agent, Director IP, NGen**

**[jerome.lafreniere@ngen.ca](mailto:jerome.lafreniere@ngen.ca)**



**Jay M. Millman**

**Patent Agent, Partner, Aird & McBurney**

**[jmillman@airdmcburney.com](mailto:jmillman@airdmcburney.com)**



# NGen

AIRD McBURNEY

