IEEE Tech Talk:
Space Debris – Who Owns It?

Steven A. Wood, Esq.
BA Geology, MSEE, JD, LLM Air and Space Law
Senior of Counsel, Vela Wood Law, PC
Advisory Board, Association of Commercial Space Professionals

© 2024, Steven A. Wood, Esq.
Copyright Act Fair Use Disclaimer

This Presentation and all Images and graphics subject to copyright herein are for Educational Purposes only and are provided under Fair Use. Such Fair Use that might otherwise constitute an infringing use is explicitly permitted by copyright statute.

Fair Use
Copyright Disclaimer under §107 of the Copyright Act of 1976, allowance is made for "fair use" for purposes such as criticism, comment, news, research, teaching, scholarship, and education.

All rights and credit in the base images herein go directly to their rightful owners. No copyright infringement is intended.

© 2024, Steven A. Wood, Esq.
Legal Disclaimer

This Presentation does not constitute legal advice or legal opinion and is for educational purposes only. I hope you find my talk useful and informative, and I would be delighted to speak with you further.

This presentation is not an offer to represent you, nor is it intended to create, nor shall the receipt of such information constitute, an attorney-client relationship. I must conduct a conflicts checks before taking on clients, please don’t send any confidential info in advance.

You should not act, or decide to not act, based upon information in this presentation, without first seeking appropriate counsel from an attorney licensed in your jurisdiction and specialized in these fields.

© 2024, Steven A. Wood, Esq.
Agenda

Space Debris
1. What is it
2. Who owns it
   • Outer Space Treaty
   • Registration Convention
   • Transfers of ownership and registration
3. How to Handle Space Debris
4. Intersections of Intellectual Property and Space Law
   • Ownership, trade secrets, and space debris
   • Temporary Presence Defense to Patent Infringement for Space and Related Activities

© 2024, Steven A. Wood, Esq.
Space Debris – What Is It?

According to NASA, Orbital Debris is: “any human-made object in orbit that no longer serves a useful purpose”

NASA elaborates that Orbital Debris includes non-functional spacecraft, abandoned launched vehicle stages, mission-related debris and fragmentations debris.

ESA defines space debris as “all non-functional, artificial objects, including fragments and elements thereof, in Earth orbit or re-entering into Earth’s atmosphere.”

ESA notes that Human-made space debris dominates over the natural meteoroid environment, except around millimetre sizes.
Outer Space Treaty Art. VIII
“A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body.”

“Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth.”

“Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return.”
Space Debris – Who Owns It? The Registration Convention

Registration Convention Art. I
(a) “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;

(b) The term "space object" includes component parts of a space object as well as its launch vehicle and parts thereof;

(c) The term "State of registry" means a launching State on whose registry a space object is carried in accordance with article II.

Art. II 2.
“Where there are two or more launching States […], they shall jointly determine which one of them shall register the object […], bearing in mind […] article VIII of the [Outer Space] Treaty without prejudice to appropriate agreements concluded or to be concluded among the launching States on jurisdiction and control over the space object and over any personnel thereof.

© 2024, Steven A. Wood, Esq.
Space Debris – Who Owns It? Transfers of Ownership

Transfers of ownership on orbit -- National registries established pursuant to Article II of the Convention are meant to contain space objects that are subsequently registered with the UN Secretary-General.

Some States keep separate registries, e.g., “Supplementary registries” or “Complementary Registries” for space objects where they are not the State of registry but have some involvement (e.g., launching State or transfers of ownership.

In case of a change in ownership of a space object, e.g., satellite, its international registration also needs to be changed notifying the UN Secretary General.

UK affected such a change when it notified the UN that AsiaSat 1, Apstar 1, and Apstar 1A satellites were transferred from the UK register to that of China (the PRC) when sovereignty over Hong Kong returned to China and informed the UN to amend the Register of Space Objects. China also notified the UN to change registration.

© 2024, Steven A. Wood, Esq.
How to Handle Space Debris?

Ownership, responsibility for jurisdiction and control, and liability for damages resulting from a space object all flow from registration under the OST and Registration Convention.

Consequently, any companies or state agencies seeking to mitigate space debris via active debris removal may only conduct operations against space objects registered:

1. on their domestic and UN registries;

2. on a foreign registry and with the UN by a country with which an appropriate agreement exists to conduct such active space debris removal.

Countries favor these prohibitions against foreign entities handling their domestic space debris for export control and trade secret protections.
Legal Bases for National Jurisdiction in Outer Space

The Outer Space Treaty (OST) and Registration Convention (RC):


RC Art. II(1) a launching State must register a space object.
RC Art. II(2) per agreement between the launching States.

OST Art. VIII states that "[a] State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body."
"In any country of the Union the following shall not be considered as infringements of the rights of a patentee:

the use on board vessels of other countries of the Union of devices forming the subject of his patent in the body of the vessel, in the machinery, tackle, gear and other accessories, when such vessels temporarily or accidentally enter the waters of the said country, provided that such devices are used there exclusively for the needs of the vessel;

the use of devices forming the subject of the patent in the construction or operation of aircraft or land vehicles of other countries of the Union, or of accessories of such aircraft or land vehicles, when those aircraft or land vehicles temporarily or accidentally enter the said country."
Temporary Presence Defense on Earth

© 2024, Steven A. Wood, Esq.
National Patent Laws and The Temporary Presence Defense

Historically, TPD evolved to prevent individual patent holders from impeding international trade and commerce and enables temporary operation of patent infringing vehicles in the domestic territory despite any domestic patents.

National Patent Laws of many space faring States include extensions of Paris Conv. Art. 5ter to apply to space objects and space-related activities.

National Laws, including Patent Laws, of the State of Registry apply based on Jurisdiction and Control required for registered Space Objects (OST VIII).

For example, French Law states that "the rights conferred by the patent shall not extend to the objects intended to be launched in the extra-atmospheric space [and] introduced onto French territory." (translated)

35 U.S.C. §105 extends U.S. patent law to registered space objects
35 U.S.C. §271 establishes the criteria for U.S. patent infringement
35 U.S.C. §272 states "The use of any invention in any vessel, aircraft or vehicle of any country which affords similar privileges to vessels, aircraft or vehicles of the United States, entering the United States temporarily or accidentally, shall not constitute infringement of any patent, if the invention is used exclusively for the needs of the vessel, aircraft or vehicle and is not offered for sale or sold in or used for the manufacture of anything to be sold in or exported from the United States."
51 U.S.C. §20135(j) (1982 revision to National Aeronautics and Space Act) states that "any object intended for launch, launched, or assembled in outer space shall be considered a vehicle for the purpose of § 272 of Title 35."

- Expanded definition for "vehicle" disproportionately impacts space efforts by U.S. Gov, Universities, and Startups who often cannot secure large foreign patent portfolios

© 2024, Steven A. Wood, Esq.
Hughes Aircraft Co. v. United States, 29 Fed. Cl. 197 (1993)


Court held the 1982 NASA Act revisions transformed spacecraft brought to U.S. for launch to outer space into "vehicles" for temporary presence doctrine and previously such spacecraft would properly be deemed cargo brought to this country for use (i.e., launch), not a vehicle or vessel under TPD.

4 of 5 UK-registered spacecraft launched before 1982, but AMPTE UKS launched in 1984, making the invention embodied in the satellite part of the "vehicle".

AMPTE UKS presence in U.S. was "temporary" under § 272, having entered U.S. only one time for the sole purpose of launch into outer space.

TPD required reciprocity was satisfied by UK extension of "similar privileges" to "vessels, aircraft and vehicles" (though NOT for spacecraft) of the United States.
Section III: Future Concerns, Subsection B. Export Law, open questions

"Status of products made in space and delivered to foreign countries. Panelists identified a number of questions that could result from the shipment of "made in space" products to Earth. What would be the effect of [1] the jurisdiction of the modules? [2] The nationality of the producer? [and, 3] The fact that the product might first land in the United States [...] and then be shipped to the ultimate destination?"

I made the following pictorial "road map" to extrapolate answers to these questions based on existing legislation and legal precedent:
A Visual Roadmap of the U.S. Temporary Presence Defense to Patent Infringement for Space and Related Activities
U.S. TPD in Space: Foreign Infringing Space Vehicles May Enter U.S. to Launch to & Return from U.S. and Non-U.S. Registered Space Facilities

Likely includes docking at/in U.S. registered space facilities
Especially for servicing, maintenance or repair
Cabotage of non-infringing goods and products is allowed
U.S. TPD in Space: Foreign Infringing Products May Enter U.S. For Launch to, Use at, and Return from Non-U.S. Registered Space Facilities

Single Transit Transshipment via U.S. Territory to and for use and consumption at Non-U.S. registered Space Facilities

© 2024, Steven A. Wood, Esq.
U.S. TPD in Space: Foreign Infringing Products May Not Enter U.S. for Launch to and Use or Consumption at U.S. Registered Space Facilities

Goods and products are not present temporarily under 35 U.S.C. §272 when intended for local consumption or use and infringement applies under §105

© 2024, Steven A. Wood, Esq.
U.S. TPD in Space: Foreign Owned & Registered Infringing Satellites May Enter U.S. to Launch and Deploy On-Orbit or In-Space for Use in Space

Foreign Registered: On-Orbit or In-Space

U.S. TPD in Space: Foreign Owned Infringing Satellites Registered in U.S. (§ 105) May Not Enter U.S. to Launch and Deploy On-Orbit or In-Space

U.S. Registered: On-Orbit or In-Space

Goods and products are not present temporarily under 35 U.S.C. §272 when intended for local consumption or use

© 2024, Steven A. Wood, Esq.
U.S. TPDI in Space: Foreign Infringing Products Assembled in Non-U.S. Registered Space Facilities May Be Transshipped via U.S. Territory

Non-U.S. Bases

Single Transit Transshipment – via U.S. Territory to and for use and consumption in foreign States – Not U.S. CBP job to stop export for infringement of any foreign patent rights
U.S. TPD in Space: Foreign Infringing Products Assembled in Non-U.S. Registered Space Facilities May Not Enter U.S. Territory for Local Use

Non-U.S. Bases

35 U.S.C. §272 does not apply and import into U.S. markets for local consumption or use requires permission of any domestic patent owners

© 2024, Steven A. Wood, Esq.
U.S. TPD in Space: Foreign Infringing Products May Not Be Assembled in U.S. Registered Space Facilities Nor Be Transshipped via U.S. Territory

U.S. Bases

35 U.S.C. §105 applies aboard U.S. registered space facilities and export via U.S. territories for foreign destinations requires permission of any domestic patent owners

© 2024, Steven A. Wood, Esq.
Points of Legal Tension and Open Questions

TPD transforms foreign infringing objects, becoming part of the "vehicle" even though kept in a cargo hold, and provides no means or circumstances, e.g., cargo unloading, under which treatment as "vehicle" may terminate or cease.

If foreign made infringing objects, e.g., goods or products, arrive at a U.S. registered space facility with a presence that is not or becomes other than "temporary", e.g., they are or become intended for local use or consumption, irrespective of the fact that such objects remain part of the "vehicle" under 51 U.S.C. § 20135(j), enforcement of patents under 35 U.S.C. § 271 assumably may proceed per 35 U.S.C. § 105 – extends U.S. patent law to U.S. space objects.

When should objects "intended for launch, launched, or assembled in outer space" cease being treated as part of the vehicle under TPD? No guidance in 51 U.S.C. § 20135(j), simply extends definition of "vehicle" to cover all objects, e.g., rockets, spacecraft, satellites, goods and products.

© 2024, Steven A. Wood, Esq.
Space Suit as a Personal Land Vehicle and Spacecraft under Paris Convention?

Under 51 U.S.C. §20135(j)
Space Suits are ‘Vehicles’ under U.S. TPD
Points of Legal Tension and Open Questions

Including "objects [...] assembled in outer space" as part of the ‘vehicle’ enables TPD protection for Earth transport of foreign infringing space-made products.

Transshipment allowed for infringing goods and products to and from space.

But, what about Transshipment of export-controlled technologies?

How to accomplish registration for "objects [...] assembled in space"?

No provisions under OST or RC, but...

For now, "registrable core facilities" of space stations and bases will have to launch from Earth (e.g., computers, tech, and other components that, for now, can only be made on Earth) and as we know, jurisdiction follows registration.

What possibilities exist for concurrent patent jurisdiction in space?

If so, what are most likely outcomes for such conflicting patent jurisdictions?
U.S. TPD applies in Space

Paris Convention TPD may fail generally to cover Spacecraft due to limitation to specific, defined types of vehicles, -- but can it work for vehicles on Celestial Bodies?

Many States affirmatively extended Paris Convention TPD to Space Objects: Patented Devices forming parts of (Vessels) Aircraft or Land Vehicles entering (the waters of) "the said country"
Points of Legal Tension and Open Questions

Territoriality of Patents vs. Non-appropriation Principle of Space Law

Can we interpret Paris Convention Art. 5ter for "aircraft" to include spacecraft or that to "enter [the waters of] the said country" can include entry into the jurisdiction of that country? -- could cover land, sea and air vehicles for space

What kinds of space activities may establish or comprise the entry of a spacecraft or space object into or within the Jurisdiction of another State?

Can docking with or entering another spacecraft, station or base affect application of jurisdiction in any way?
• International Space Station, Artemis, Lunar Gateway, Orbital Reef, etc.
• "Astronauts" physically entering a foreign spacecraft, station or base
• Landing or driving into a foreign space base hangar or vehicle bay

© 2024, Steven A. Wood, Esq.
State of Registry chosen from 4+ Launch States:
State from whose [1] Territory or [2] Facility the object is launched, or

For Marine Facilities
- State of Registration, \textit{i.e.}, the Flag State of the facility
- Nationality of launch facility owner/operator


- Launch Capable
- Abandoned
- ESA Members
- Planned

© 2024, Steven A. Wood, Esq.
Thank you for your attention, please reach out with any questions:

Steven Wood
swood@velawood.com
512-813-7300