

PROPERTY RIGHTS AND SPACE RESOURCES DEVELOPMENT

By: Declan J. O'Donnell, United Societies in Space, Denver, CO

Abstract

The consensus approach to space development begins with the scientific use of space resources as building blocks. However, the international treaty regime categorizes space resources as communal property not subject to appropriation or private ownership and, in the event of exploitation and usage, then subject to a treaty burden known as benefit sharing. This rigid and exclusive legal regime of property law in outer space is analogized to the King's Law of England over 1,000 years ago. A solution is proposed by analogizing to the development of a common law in England that included the creation of common law usage estates, such as leases, easements, mortgages, and trusts.

The first principle of common law is that no remedy exists "at law" i.e. in the King's Court. If one is available, or if the King intervenes in any way, the common law yields to that authority. The United Nations and its member nations are analogized to the King and the King's Courts.

The second principle of the common law property estates is that they relate only to temporary usage on a fair and "equitable basis". They exclude any concept of legal ownership. However, in modern times, the equitable estates represent the core of most commercial transactions. The legal title known as "fee simple absolute" is rarely relied upon by businesses, although it is available at law.

The Lunar Economic Development Authority is described as a likely manager of astro law estates that are based on common law extended into space. It is a trust estate itself and does not contravene any of the Space Treaty provisions on sovereignty, appropriation, benefit sharing, or international cooperation. It is currently operational. It would be able to register leases, easements, and mortgages for developers of the Moon.

INTRODUCTION

Political Void In Space. There is a defacto void in statutes, regulations, and rules applicable generally in the territory known as outer space. There is also a de jure void in legal authority generally applicable in outer space in that the five space treaties enact a space policy that prevents Nations from extending their own sovereignty into space. Space treaty law is part of International Treaty Law, but literally legislates the maintenance of a political void in outer space.¹

The space faring Nations are not able to correct this space policy because they have all signed and ratified a treaty that prevents them from asserting their sovereignty into space. Thus, they have relied upon the United Nations to organize a proper paradigm for space governance, but that duty was not performed. Instead, a legal void in space government was codified. The only exception by treaty law is that Nations may assert their own sovereignty inside of their space ships. The treaty law in this regard is very specific about the applicability of mission rules inside of the space ship so there is no basis for extending those rules outside in order to create property rights on the Moon, Mars, or in orbit²

Therefore, there are no private property estates in the territory of outer space. Instead, space resources are considered common property to be held for the benefit of future generations of humankind, not able to be appropriated by any nation, and not subject to ownership by any person, company or association.³

Benefit Sharing. In the event that some space resources are taken for any purpose, somehow not in contravention of the above-described anti-appropriation treaty burden, then the benefit-sharing burden would apply. This burden pre-dates the Outer Space Treaty and is codified into it. The original intent was that net profits from the exploitation of space resources must be sponsored by all nations, for the benefit of all humanity, and actually delivered pro-rata to all governments on Earth.⁴

However, the benefit sharing treaty burden is not well defined, is surrounded by conflicting interpretations, and was practically overruled by the United Nations Resolutions on

¹ The five space treaties are: 1) Treaty on Principles Governing the Activities of States in the Exploration and Uses of Outer Space, including the Moon and Other Celestial Bodies, known as the Outer Space Treaty of 1967; 2) Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, known as the Rescue and Return Treaty of 1968; 3) Convention on International Liability for Damage caused by Space Objects, known as the Liability Treaty of 1972; 4) Convention on Registration of Objects Launched into Outer Space, known as the Registration Treaty of 1975; and, 5) Treaty Governing the Activities of States on the Moon and Other Celestial Bodies, known as the Moon Treaty of 1979. Also see, Goldman, N.C. and O'Donnell, D.J., "Revisiting the Outer Space Treaty: A Re-Examination of the Sovereignty-Jurisdiction Compromise," IISL, 1997, IISL 4.05, 1997.

² Outer Space Treaty, Article VIII.

³ Outer Space Treaty, Article II

⁴ Outer Space Treaty, Article I

International Cooperation dated in 1996. The vague concept that satellites are good for society may justify their legal existence and satisfy the treaty according to the space industry. This area of space law is not well developed and needs to be clarified, probably by litigation.⁵

Changed Circumstances. The world has changed materially from the days of the space treaties during the 1960's and 1970's. As we enter the 3rd millennium the Cold War has ended, the International Space Station is partly assembled, and the world is generally at and enjoys economic growth. Private industry is now spending more on space than governments. The entire background that occasioned the space treaties and dictated public policy about space is now reversed. Perhaps it is timely to contest those policies by creating a new paradigm of space governance, a new view of private property in space, and a new common law extension into outer space. The space treaties should be used as a shield against over reaching by dominant nations rather than as a sword that prevents all space development. There is legal basis to make a transition.⁶

SPACE RESOURCES

Space Objects. It is settled law that objects made by mankind and launched into space (or intended for that purpose) are categorized as space objects. Everything else is categorized as space resources, including the void vacuum of space itself. The launching parties and their national sponsors are forever liable for any damage caused by space objects, with absolute liability assigned to the Nations.⁷

Because of this absolute national liability policy, each launching national sponsor requires licensure and liability insurance prior to launch. The U.S.A. has enacted a \$500,000,000 limit to such insurance, but the premium is about 18% of the coverage. That means that the cost of a launch may be increased by up to \$90,000,000 in order to insure America's risk.

Furthermore, there is no time limit to terminate the insured peril. This places a difficult risk management burden on sponsors of long term space projects. For example, a privately placed hotel in Earth orbit could extend the sponsor's national liability exposure by the useful life of the orbital hotel, perhaps decades into the future. Unless or until a way to contain or eliminate that risk is legally in place, there is doubt that any license would issue for launch. Placing a settlement on the Moon or a Camp on Mars could occasion the same licensor hesitancy. Thus, it may be said that the 1972 treaty policy on space object liability has created a

⁵ O'Donnell, D.J.; Robinson III, G.S.; Robinson IV, G.S.; "This Treaty Needs a Lawsuit," 48 IAF, IISL 97 IISL 3.08, Turin, Italy; Also, see O'Donnell, D.J. "Benefit Sharing: The Municipal Model", IAF, IISL 96 IISL 3.09, Beijing, 1996.

⁶ Goldman, N.C. and O'Donnell, D.J., "Revisiting the Outer Space Treaty: a Re-Examination of the Sovereignty - Jurisdiction Compromise," 48 IAF, 97 IISL 4.05, 1997; Goldman, N.D. "Policy Considerations for the Utilization of Space Resources", *Space Governance Journal*, V4, No2, 1997, P 2; O'Donnell, D.J., "Overcoming Barriers to Space Travel", *Space Policy*, V10, No 4, Nov. 1994, P. 252.

⁷ Convention on International Liability for Damage caused by Space Objects, known as the Liability Treaty of 1972.

barrier to long term space travel.⁸

Space debris consists almost entirely of space objects that have been left as rubbish in earth orbit. The Air Force tracks over 10,000 large pieces of space debris daily. Liability for damage caused by debris rests on the nation that sponsored the launch that occasioned the debris. This ongoing and long-term peril is difficult to measure. Not only is the amount of debris very large, consisting of about 1 billion pieces when small items are counted, but the law of salvage is non-existent in space. There is a legal risk that the sponsor nation could consider a third party's capture for salvage as a trespass, if not an act of war. There is a real need for clarification as to the law in this particular lest space debris remain unattended forever.⁹

Mixed Property. There is a peculiar circumstance that arises in space law when space objects are mixed with space resources. The space treaties have no mention of how to treat the resulting property. For example, if a Lunar orbiting space ship was enlarged by adding cement with Lunar regolith to build a larger vessel, would the resulting hybrid vessel be a space object (subject to forever liability risks to the national sponsor) or would it be a space resource, (subject to forever benefit sharing). No one knows for sure.

However, the United Nations Committee on Peaceful Uses of Outer Space, (UNCOPUOS), speaking through Mr. Paul Dembling, its General Counsel, (and former attorney for NASA), declared that both statuses would remain legally viable. If the resulting cement satellite consisted of 20% space resources and 80% space objects, then benefit sharing would attach to 20% of its revenues (and national liability of the sponsor would attach to 80% of the damages caused by it). These treaty burdens are not cut off by the change in form, the passage of time, or the domestic laws, such as liability limits for insurance purposes, enacted on Earth.¹⁰

Space Resource Utilization. Despite this uncertain but apparently anti-development philosophy of International Space Treaty Law, space industry leaders plan to utilize space resources in order to develop space for human habitation and otherwise. The historical survey of proposals to use space resources for development purposes include appropriations as follows:

⁸ O'Donnell, D.J., "Overcoming Barriers to Space Travel", *Space Policy*, V10, No 4, Nov 1994, P 252.

⁹ Jasentuliyana, N, "Space Debris and the Law of Salvage," *Journal of Space Law*, 1997.

¹⁰ Gorove, *Journal of Space Law*, 1995, commentary on UNCOPUOS.

- A. Regolith for cement.¹¹
- B. Mining minerals.¹²
- C. Mining asteroids¹³
- D. Manufacture of propellant oxygen from Lunar resources.¹⁴
- E. Iron and alloys of iron.¹⁵
- F. Bio processing of ores in space.¹⁶
- G. Creating Lunar bases.¹⁷
- H. Lunar solar powers systems and solar powered satellites.¹⁸
- I. Lunar helium 3 nuclear reactors.¹⁹
- J. Human colonies in orbit.²⁰
- K. Terra-forming Mars.²¹

Anti Utilization Legal Regime. So far we have not appropriated any space resources, except solar rays earth orbits, and Moon rocks retrieved for scientific research and international diplomacy purposes. The mass utilization of space resources for commercial and settlement purposes has not yet begun. There are no substantial technical barriers to living and working in space though cost is still a problem. Other problems are delaying our conquest of the final frontier: Space law and space policy problems.²²

For example, licenser of a Lunar mission to extract Moon rocks and return them to Earth for

¹¹ Agosto, W.N., "Lunar Cement," NASA, S.P. 509.

¹² Duke, M.B., "Lunar Exploration for Resource Utilization," NASA S.P. 509.

¹³ Lewis, John S., Mining the Sky, Univ of Arizona Press, 1998.

¹⁴ Rosenberg, S.D.; Beegle, R.L.; Guter, G.A.; Miller, F.E.; Rothenberg, M; "The Onsite Manufacture of Propellant Oxygen from Lunar Resources," NASA, S.P. 509.

¹⁵ Sastri, Sankar, "Iron and Alloys of Iron," NASA S.P. 509, and Simon, M., "Utilization of Space Resources in the Space Transportation System," S.P. 509, p. 97, 1992.

¹⁶ Johauson, K.R., "Bio-processing of Ores: Application to Space Resources," S.P. 509, V.3, 1992.

¹⁷ Repic, E.M.; Richter, P.; Roy, C.; "The Lunar Resource Base: Stepping Stone to Mars," IAF 92-0542, 1992.

¹⁸ Criswell, D., and Glazer, P., in passim.

¹⁹ Kulcinski, G.L. and Schmidt, H., in passim.

²⁰ O'Neill, G.K. and Space Studies Institute, Princeton, N.J.

²¹ Zubrin, R., The Case for Mars, Freedom Press, N.Y., 1998.

²² O'Donnell, D.J., in passim.

commercial jewelry exploitation presents a problem. The requirement of every nation as a condition to its license for launch is 100% compliance with international law. If the mission features space resource commercial appropriation of Moon rocks, licensor conditions could not be met because international law is contrary.²³

Therefore, a tension exists between industry plans for space development and national standards for treaty compliance. Space resource utilization is at the center of that problem.

Proposed Solution. A possible solution may be found in the Moon Treaty. It can be read to approve space resource utilization for non-commercial purposes, i.e. construction of habitat on the Moon. It appears to approve commercial uses, also, subject to the treaty burden of equitable benefit sharing. The “equitable” standard is one that court systems worldwide apply on a day to day basis without much legal difficulty. The lingering problem with this treaty is that a new concept was also mentioned, the common heritage of mankind. Thus, the benefit of this treaty could be canceled by the burden of this new concept.²⁴

The common heritage of mankind is defined as a term of art to require all five of the following standards:

1. That the area be preserved for future generations of humankind.
2. That all nations be active in the management of the area.
3. That all nations actually receive benefits by distribution.
4. That there be full compliance with international law, including a sharing of all R & D results, and,
5. That the area be dedicated to non-military purposes, exclusively.²⁵

Another avenue of solution for those who care to develop the Moon, Mars, and all orbits in space may be found in another provision in the Moon Treaty. This is the provision that calls for adoption of another legal regime when space development appears to be feasible. Obviously, this opportunity should be seized by industry leaders to propose a legal regime and a space governance paradigm that encourages development, rather than one that does not.

This was accomplished recently in the Deep Sea Bed Treaty part of the United Nations Law of the Sea Treaty, 1995. In the implementing legislation in Congress, America required that it be the managing partner of the managing syndicate of nations managing the authority that manages the area. Consent of the other nations was forthcoming so that treaty was adopted and the seabed is being mined under congressional implementing legislation by an authority.²⁵

²³ Outer Space Treaty, Article II

²⁴ O'Donnell, D.J., Harris, P.R., “Is it Time to Amend or Replace the Moon Treaty?”, A.B.A. *Air and Space Journal*, Chicago, 1994, p. 3; and, O'Donnell, D.J., “An Archenemy Revisited: The 1979 Moon Agreement May Help Commercial Space Development,” *Space 98*, ASCE, Albuquerque, N.M., 1998, (an invited paper).

²⁵ United Nations Treaty on the Law of the Sea, 1982.

²⁶ Clancy, E.A., “The Tragedy of the Global Common,” *Indiana Journal of Global Legal Studies*, 1998, 601, at p. 612.

Analogously, we may require that our space industry governance entities, (see below), be designated the new regime under the Moon Treaty. This would permit space industry influence in the management of space resources, one that could clarify reasonable and “equitable sharing” rather than “Common Heritage of Mankind” standards. It may lead to the treaty designation of the Lunar Economic Development Authority, Inc., as the new regime for the Moon.²⁶

The Regency. United Societies In Space has proposed the space governance solution: that refers to direct governance of space as a territory in order to manage the uses of space resources. A non-sovereign Regency of United Societies In Space, (ROUSIS), is planned for adoption on August 4, 2000. A minimum of 200 Regents would organize this 100 year entity to provide legislative, executive, and judicial departments for space governance purposes. It would be charged with the duty to transform humanity into a space faring society, build an appropriate space based infrastructure, and cause a more permanent government with United Nations approval to be established by settlers in space on or before August 4, 2100. During the 100 year Regency authorities for the Moon, Mars and larger orbits would be able to coordinate space resource uses with the regency legislature; resolve disputes in a unique space oriented court system, and obtain executive assistance as requested. If recognized internationally, this governance structure would also issue space money to pay for space development.²⁷

The Regency proposal is designed to cure the most pressing space policy problem of all: It will assist in the governance, jurisdiction, and consensus management of space resources. This will involve the maintenance of a system of private property in outer space, one that is traditional, intelligible, relevant, and possible. It is planned that such system be created well before settlers arrive in space so investors can adjust to it by advancing funds up front, rather than waiting to see if space in fact develops without private enterprise. The creation of astro law estates as described below is at the center of the system.

However, it must be noted that there are many space policy problems that need to be cured prior to space settlement. The Regency and its constellation of authorities will be available to assist the United Nations, the space faring nations, and the developing nations in arriving at fair solutions. This Regency is not going to replace any existing institutions. It is merely going to serve as a catalyst to help competing interests on Earth arrange their affairs more equitably in respect to space development.

These include:

- A. Chronic lack of focus by governments, (because of competing higher priority programs).
- B. Chronic lack of adequate financing for outer space projects.
- C. Chronic lack of material and substantial international cooperation for space related endeavors.

²⁷ Smith, M.L., “Compliance with International Space Law of the LEDA Proposal”, *Space Governance Journal*, V4, No 1, P 16; O'Donnell, D.J., “Benefit Sharing: The Municipal Model”, I.A.F, IISL 1996, IISL 3.09, 1996, Beijing, China; Goldman, N.C., “A Lawyer's Perspective on the USIS Strategies for Metanation and a Lunar Economic Development Authority”, *Space Governance Journal*, V3, No 1, 1996, P 16.

²⁸ O'Donnell, D.J., “Space Resource Management: The Regency Proposal,” IAF, 1998, IISL 3.05, Melbourne, 1998.

- D. The treaty burden of non-appropriation (of outer space communal property), and,
- E. The treaty burden of benefit sharing (under any type of formula proposed to date).

By filling up the political void in outer space with a reasonable, civilian, and international governmental entity, even a temporary Regency, the chronic and constitutional level barriers to space development can be revisited. Humanity will at least have a proper forum to re-look at space and re-determine our priorities in respect to it. By maintaining a government in space, Earth nations can use it to limit their long-term liability for space objects launched by them, or under their registration. The Regency would take over that liability once the space object exceeded Earth's jurisdiction and become subject to Regency jurisdiction. Similarly, all space activity that exceeded Earth jurisdiction could be repaired by the Regency.

SPACE PROPERTY RIGHTS

Competing Proposals. The space treaty regime clearly contemplates no system of private property during the exploration phase of outer space activity. The Moon treaty modifies that concept by calling for a new regime of space law when space development appears to be feasible. It does not specify that private property rights be part of that new regime. Also, the United Nations UNCOPUOS is looking at a mining law for outer space, but that has not yet been placed on its formal agenda, nor on the agenda of its legal sub committee. The National Space Society Committee on space property rights appeared at Uni-Space III in Austria in 1999 to promote that result. It has reported that it presented a case against the Moon Treaty entirely so any new regime should be independent. The NSS only proposed that mined minerals could be owned after they were extracted: no comprehensive property system was suggested.

Dr. Harrison Schmidt has proposed a space governance system called Interlune. It would organize space activity at and near the Moon. The managers would be on Earth and controlled by the user nations. No private property regime was identified but space resource management was clearly implied as part of the governance scheme as proposed.

Dr. Bruce Cordell, a Regent of USIS, followed up on the Harrison Schmidt Interlune proposal with a more elaborate space governance system called Inter Space. It featured a United Nation sponsored headquarters near the equator with launch facilities. It covered areas near the Moon and near Mars, leaving the rest of space ungoverned. An elaborate system of electing managers and organizing launches and governing space venues was described. Again, no system of private property was included, but the act of governance in space implied space resource management.²⁸

These are the two leading proposals that have been published to date. The following proposals are also important, however, because they could fit into these broader concepts.

Mr. Wayne White, a member of the International Institute of Space Law, has proposed that space faring nations adopt domestic legislation that allowed space settlers to use space resources for 1-5 years. If they in fact worked the land and analogously dropped their sweat into it, then an equity position could be decreed by their sponsoring nation. This scheme gained reciprocity, and, therefore, a recognizable interest in the property, by virtue of international comity. The code system demonstrating sweat equity on the ground is the legal justification for this system.²⁹

²⁹ Cordell, B., "Inter Space: a Design for a Government in Space," *Space Policy Journal*, 1994.

³⁰ White, W. "Real Property Rights in Outer Space," IAF, IISL, 1998, p 320, Melbourne, Aus.

Mr. White elaborated on this proposal by acknowledging certain problems. He sees it as a transition system only and recognizes the need for a more permanent space governance system with settlements in charge of their own destiny. However, he clearly recognizes the over riding need for a private property system, one that can be used by investors and settlers before they launch into space.³⁰

A land grant proposal is backed by a group within the National Space Society headed by Mr. Alan Wasser. Congress is called upon to grant land on the Moon and Mars as a reward to developers who land there. The size of the grant would depend on the plan of development. This proposal mimics the American land grant program that fueled development of the wild west.³¹ However, the U.S. is a signatory to international treaties that would seem contrary to this suggestion.

Mrs. Denise Norris leads another group within the NSS. She has proposed that NSS take a position in favor of “possession is equal to ownership” in space resources. She has analogized to England’s colonial period. This proposal is popular with the Libertarian members of the space community, but is probably contrary to space treaty law. Reconciliation is attempted by citing Article 9 of the Outer Space Treaty which authorizes interventions to protect your property in space.

By far the most popular, successful, well defined, traditional, and simple system of property rights in outer space is that conducted by Mr. Dennis Hope and the Lunar Embassy. This enterprising realtor in southern California registered the Moon and Mars as his property under California real estate registration laws. Now he sells 100-acre tracts for about \$20 USD each. Several promoters have tried to copy this technique, but none have succeeded. The subdivided Moon has already sold over 20,000 sites and Mars, which has just last year been subdivided and offered for sale, has already sold about 10,000 sites. The Web site is magical, but the scheme is illegal, unless taken as presented, i.e. as a symbolic gesture only.³²

None of these proposals are comprehensive of a governance, property, contract, tort, and development system. However, aspects of all of them are combined in the Regency proposal.

Common Law Estates. The common law has developed over 1000 years throughout the British Commonwealth and in America. It features case law regarding property, contracts, torts, and criminal law. Common law cases are reported in a 50 volume set of books entitled “Corpus Juris Secundum, (Second Body of Law).

The word Second does not mean that the first volume went out of print so they published a Second Volume. Instead, it means that it is secondary law, i.e. the treaties, constitutions, and statutes of the State take first priority, or have precedence. The first principle of common law is that it only applies where the King’s law is silent, does not apply, or is in conflict.

The second principle is that common law property estates relate only to usage. They do not include any legal ownership. This is particularly important because the non-appropriation

³¹ White, W., “Implications of a Proposal for Real Property Rights in Outer Space,” IAF - IISL, 1999 - IISL 4.12, Amsterdam, 1999.

³² “Land Grants for Space,” *Ad Astra*, magazine of NSS, 1998, by Alan Wasser.

³³ Contact Mr. Dennis Hope, Lunar Embassy, Rio Vista, California.

treaty burden means that common property can not be owned by anyone. It is presumed that some form of usage of space communal property was contemplated from the beginning because the corresponding treaty burden of benefit sharing could otherwise never be effected. It is a priori impossible to benefit share unless one could first have use of the resource (at a minimum).

Common law property estates began with the following classic tale: Once upon a time a Landed Knight went off to crusade for the Church. Before he left he deeded his castle to his best friend with secret written instructions that he return the deed when the Knight returned from the crusade, or, if he failed to return, then to deed the castle to his eldest son, when he turned 21 years old. This secret transaction was required because the King's law did not provide for land ownership by wives and/or minor children.

Typically the Knight in shining armor failed to return and quite often the best friend refused to acknowledge the secret instructions because the King's Law did not require it.

One time the eldest son went to the local parish church court and complained that the crusade was church business, that the church ought to recognize his father's last wishes, and that the King's law was merely silent on the subject of secret instructions, not prohibitive. The local priest took the case to the local church court which had no trouble enforcing the secret instructions without revoking the Kings deed. It declared both documents enforceable and labeled the eldest son the beneficiary of the estate that was the corpus of a trust held by the best friend, now known as the trustee. The beneficiary would keep possession and the trustee would manage the castle by accounting to the eldest son for all profits of the trust estate as it was described in the King's deed.

Obviously, the best friend complained in the King's court. No remedy could be afforded because he clearly remained as a grantee under a legal deed. The Kings court did not recognize the secret instructions so it could not act upon them, not even for the purpose of over-ruling the Church Court. Only the King could do so and he typically refused because the church was well recognized, the crusades were church business, and the results were fair i.e. "Equitable". This is the exact beginning our Modern law of trusts.

Soon the church court was known as a court of equity and related problems were referred to it. For example, the frustrated trustee, (our Knight's best friend), tried to evict all of the castle's serfs in order to force the eldest son off the property. The church court again recognized that there was no remedy at the King's court so it created the equitable estate of tenancy. If the serf had resided on the castle property for one year, the serf was held to possess a year to year lease. Again the King's court had no contrary remedy and the King refused to act personally because the results were in fact equitable. From this simple beginning evolved our modern law of leasehold estates.

The law of easements evolved when the frustrated trustee tried to cut off ingress and egress to the beneficiary and his serfs. As you can imagine, the church court recognized their meager possessory estates as dominant estates and the next best friend's estate at law as subservient to the easements. Now the law of easements is so common and so well defined that virtually any property interest is defended in equity by the declaration of adequate easements to insure its intended use to the person in possession.

The property estate known as the mortgage evolved when the beneficiary needed to borrow money but did not have any legal title to pledge to the lender. The church court decreed that he held "equitable title" and that could be conveyed to support the loan as security. Again the King's court had no rule against it and the King himself found the arrangement "equitable" and refused to intervene.

No Objection. This system flourished for 1,000 years because the King did not object. If he objected, then his decree took precedence. However, the King always acted as a legislature/regulator so decrees affected everyone equally. Therefore, if 99-year leases were found objectionable, then ALL leases would be reduced in length equally.

In the beginning of space law two principles were established by common law processes. The first is the space law that satellites may trespass over national borders without permission. Sputnik took one revolution in orbit in 1957 and no nations filed any formal objection. That established space common law so strongly that it persists today despite the enactment of 5 space treaties after that, none of which mentioned this law: there was no need to do so because there was no objection.

Another principle of space common law is that of non-interference which is now codified at Article 9 of the Outer Space Treaty. It springs from the essays that preserved free passage in space even in the case that Russia would establish a “Host Nation In Space” someday.³³ This folklore regarding free passage may be recognized as part of the non-interference treaty burden. In this example it is demonstrated that the King may enact a decree that CODIFIES a principle of common law. In such cases the courts of equity, which soon merged into the King’s court system, used the common law history of the principle to interpret and apply the new decree on a case by case basis. The common law was therefore helpful, except where it was specifically overruled by some form of objection by the King, (or, here, the United Nations or its members). Analogously, the common law estates should be used in outer space where the United Nations acting as the King’s law, has left a void and is silent on the subject. The space governance entities, particularly the Lunar Economic Development Authority at the venue of the Moon, should be able to forge these estates for the benefit of humanity, and all nations, and the United Nations.

In this context the space governance entities are analogous to the trust estate. They feature a court system that may succeed to the tradition of the court of equity. Users of the Moon may register their negotiated common law leases with the relevant space governance entity, such as the Lunar Economic Development Authority (LEDA). Because there is a treaty relating to registration, that entity would cross-reference all of its leaseholds, easements, and mortgages with the proper United Nations office in charge of registration. This office only registers space objects so the LEDA would clarify that its leaseholds are man made personal property intended for usage in space, thus expanding the space law of registration, but doing so in a common law way.³⁴

Astro Law. The transition from ancient common law to modern astro law can be predicted because it fills a need and does so equitably. As three leading commentators put it: “Nevertheless, rules must be established regarding the manner in which property may be acquired and maintained, (in outer space), and to apply those rules to all entities, whether they be individuals, corporations, states, or international organizations.”³⁵

³⁴ Alifanov, Oleg, “Space is the Place for Synergy”, *Space Governance Journal*, 1996.

³⁵ The Registration Treaty: See Note (1) above.

³⁶ Stine, G.H.; Sterns, P.M.; Tennen, L.Q.; “Preliminary Jurisdictional Observations Concerning Property Rights on the Moon and other Celestial Bodies in the Commercial Space Age,” IAF, IISL 1996 - IISL 1.08, Beijing, 1996, p. 5.

Maturity into workable astro law estates can be organized under the A-E-I-O-U formula as follows:

- A. The rule of property law will apply in the ASTRO venue only.
- E. EQUITABLE estates at common law will be used and limited to usage without any ownership.
- I. All such user estates, leases, easements, and mortgages, will be INCHOATE and defeasible by treaty law later enacted.
- O. All such rules are applicable OUTSIDE of space ships because the Outer Space Treaty Article VIII reserves the inside for the exclusive jurisdiction of the sponsoring states.
- U. All of the estates are also subject to USES required by treaty and other UNIVERSAL legal burdens already in existence.,

Another monitoring force in modern society is the public interest litigation. Persons interested in preserving space for future generations of humankind may be expected to protest in court. Standing to do so may be conceded because precedent is already set. It is probably better to plan on reasonable and equitable substance than sophisticated procedure.³⁶

CONCLUSION

The space resource management regime in the future may be organized within a non-sovereign constellation of space governance entities. These are not contrary to space treaty requirements and may be analogized to common law trust. The LEDA may represent a likely registration vehicle for such common law estates.

The Astro Law that may emerge would build upon common law estates such as leases and easements. Unless and until the United Nations objects or enacts a treaty to the contrary, commercial development of space resources would be authorized. It is important that these be equitable in nature and secondary to treaty burdens, all of which should be engrafted into the estates.

The LEDA is viewed as a compliant organization. It should proceed to work on common law extensions of property law into outer space. There is no legal obstacle foreseen to such equitable activity at the usage level of possession that defers to international treaty law at each step of the way.

³⁷ Gardner, J. "Discrimination Against Future Generations," V. 9 *Environmental Law Journal*, p. 29, re. Tertiary jurisdiction, at p. 50: relationships of persons asserting the cause must be identifiable to those whose rights are being protected, plus distinct, and palpable threat to the Plaintiff's personally. See 422 US 490, Warth v Selvin, 1975; 428 US 106, Singleton v Wolf, 1975; and V. 6 *Georgetown International Environmental Law Review*, p. 713, "The Philippine Children's Case Recognizing Standing for Future Generations", by Ted Allen.

* Chairman of the program is Dr. Michael Duke, Lunar and Planetary Institute, (LPI). Sponsors are NASA, the Colorado School of Mines, and LPI. Contact Dr. Michael Duke at duke@lpi.jsc.nasa.gov. Also, contact the Office of Special Programs and Continuing Education, (SPACE), Colorado School of Mines, 303-273-3321 and Fax 303-273-3314, and www@mines.edu/outreach/cont-ed.

** Declan J. O'Donnell is an attorney practicing in Colorado. He is President of the World Space Bar Association; President of United Societies In Space, Inc.; General Counsel to the Lunar Economic Development Authority, Inc.; a member of the International Institute of Space Law; a member of the National Space Society; Board of Director member of the Mars Society; and Publisher of *Space Governance Journal*.

END NOTES:

- (1) The five Space Treaties are as follows:
 - (1) Treaty on Principles Governing the Activities of States in the Exploration and Uses of Outer, including the Moon and Other Celestial Bodies, known as the Outer Space Treaty of 1967;
 - (2) Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, known as the Rescue and Return Treaty of 1968;
 - (3) Convention on International Liability for Damage caused by Space Objects, known as the Liability Treaty of 1972;
 - (4) Convention on Registration of Objects Launched into Outer Space, known as the Registration Treaty of 1975; and,
 - (5) Treaty Governing the Activities of States on the Moon and Other Celestial Bodies, known as the Moon Treaty of 1979.Also see, Goldman, N.C. and O'Donnell, D.J., "Revisiting the Outer Space Treaty: A Re-Examination of the Sovereignty-Jurisdiction Compromise, IISL-97-IISL.4.05,1997.
- (2) O.S.T. Article VII
- (3) O.S.T. Article II
- (4) O.S.T. Article I
- (5) O'Donnell, D.J.; Robinson III, G.S.; Robinson IV, G.S., "This Treaty Needs a Lawsuit", 48 IAF, IISL 97 IISL 3.08, Turin, Italy; Also, see O'Donnell, D.J., "Benefit Sharing: The Municipal Model", IAF, IISL 96 IISL 3.09, Beijing, 1996.
- (6) Goldman, N.C. and O'Donnell, D.J., "Revisiting the Outer Space Treaty: a Re-Examination of the Sovereignty – Jurisdiction Compromise," 48 IAF, 97 IISL 4.05, 1997; Goldman, N.D., "Policy Considerations for the Utilization of Space Resources", Space Governance Journal, V.4 N.2, 1997, p 2; O'Donnell, D.J., "Overcoming Barriers to Space Travel", Space Policy, V10, No 4, Nov 1994, p252.
- (7) Convention on International Liability for Damage caused by Space Objects, known as the Liability Treaty of 1972.

- (8) O'Donnell, D.J., "Overcoming Barriers to Space Travel", *Space Policy Journal*, V.10. N.4., Nov., 1994, p252.
- (9) Jasentuliyana, N, "Space Debris and the Law of Salvage," *Journal of Space Law*, 1997.
- (10) Gorove, *Journal of Space Law*, 1995, Commentary on UNCOPUOS.
- (11) Agosto, W. N., "Lunar Cement", McKay, M.F., McKay, D.S., and Duke, M.B., *Space Resources*, eds NASA SP 509, 1991.
- (12) Duke, M.B., "Lunar Exploration for Resource Utilization", NASA S.P. 509.
- (13) Lewis, J., Mining the Skies, Arizona State University Press, 1998.
- (14) Rosenberg, S.D.; Beegle, R.L.; Guter, G.A.; Miller, F.E.; Rothenberg, M; "The Onsite Manufacture of Propellant Oxygen from Lunar Resources", NASA, S.P. 509.
- (15) Sastri, Sankar, "Iron and Alloys of Iron", NASA, S.P. 509, and Simon, M., "Utilization of Space Resources in the Space Transportation System", S.P. 509, p97, 1992.
- (16) Johnson, K.R., "Bio-processing of Ores: Application to Space Resources", S.P. 509, V.3, 1992.
- (17) Repic, E.M.; Richter, P.; Roy, C.: "The Lunar Resource Base: Stepping Stone to Mars", IAF 92-0542, 1992.
- (18) Criswell, D., and Glazer, P., in passim.
- (19) Kulcinski, G.L. and Schmitt, H., in passim.
- (20) O'Neill, G.K. and Space Studies Institute, Princeton, N.J.
- (21) Zubrin, R., The Case For Mars; The Plan to Settle the Red Planet and Why we Must, with Richard Wagner, The Free Press, N.Y., 1996.
- (22) O'Donnell, D.J., in passim.
- (23) O.S.T., Article II.
- (24) O'Donnell, D.J., Harris, P. R., "Is It Time to Amend or Replace the Moon Treaty?", A.B.A. Air and Space Journal, Chicago, 1994, p3; and O'Donnell, D.J., "An Archenemy Revisited: The 1979 Moon Agreement May Help Commercial Space Development", Space 98, ASCE, Albuquerque, N.M., 1998, (an invited paper).
- (25) United Nations Treaty on the Law of the Sea, 1982.
- (26) Clancy, E.A., "The Tragedy of the Global Common", *Indiana Journal of Global Legal Studies*, 1998, 601, at p612.

- (27) Smith, Milton "Skip" L., "Compliance With International Space Law of the L.E.D.A. Proposal", *Space Governance Journal*, V.4. N.1., 1997, p16; O'Donnell, D.J., "Benefit Sharing: The Municipal Model", I.A.F., IISL 1996, IISL 3.09, 1996, Beijing, China; Goldman, N.C., "A Lawyer's Perspective on the USIS Strategies for Metanation and a Lunar Economic Development Authority", *Space Governance Journal*, V3, No 1, 1996, p16.
- (28) O'Donnell, D.J., "Space Resource Management: The Regency Proposal", I.A.F., 1998, IISL 3.05, Melbourne, 1998.
- (29) Cordell, B., "Inter Space: A Design for a Government in Space", *Space Policy Journal*, 1994.
- (30) White, W., "Real Property Rights in Outer Space", I.A.F., IISL, 1998, p320, Melbourne, Aus.
- (31) White, W., "Implications of a Proposal for Real Property Rights in Outer Space", I.A.F.-IISL, 1999- IISL 4.12, Amsterdam, 1999.
- (32) "Land Grants for Space", *Ad Astra*, Magazine of NSS, 1998, by Alan Wasser.
- (33) Contact Mr. Dennis Hope, Lunar Embassy, Rio Vista, California.
- (34) Alifanov, Oleg, "Space is the Place for Synergy", *Space Governance Journal*, 1996.
- (35) The Registration Treaty. See Note (1) above.
- (36) Stine, G.H.; Sterns, P.M., Tennen, L.Q.; "Preliminary Jurisdictional Observations Concerning Property Rights on the Moon and other Celestial Bodies in the Commercial Space Age", I.A.F. IISL 1996 – IISL 1.08, Beijing, 1996, p5.
- (37) Gardner, J., "Discrimination Against Future Generations", V.9 *Environmental Law Journal*, p29, re. Tertiary Jurisdiction, at p50: Relationships of persons asserting the cause must be identifiable to those whose rights are being protected, plus distinct, and palpable threat to the Plaintiff's personally. See 422 US 490, Warth v Selvin, 1975, 428 US 106, Singleton v Wolf, 1975; and V. 6 *Georgetown International Environmental Law Review*, p713, "The Philippine Children's Case Recognizing Standing for Future Generations", by Ted Allen.