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HUMAN SOCIETY IN MARS: NEW LEGAL NEEDS FOR A DIFFERENT MANKIND.

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Abstract.

Future human settlements, in Mars and other celestial bodies, assume the establishment of new residences for mankind, and imply the birth of new human civilizations which will have cultural, economic, philosophic, ecological, biological and, of course, legal consequences. Space Law consider legal facts and relations from an Earth-centric point of view. A Cosmic Law considering the new foreseen life in space must be elaborated upon few and clear principles to be developed in each human space settlement.

1. The present stage.

The first space settlements in the Moon or Mars are being dreamed of and planned. Dr. Eilene Galloway explains the difficulties that must be solved before these settlements are a reality: Human health and safety in the Lunar and Mars' environments depend upon solutions to problems of radiation, microgravity, maintenance of life support systems, contamination avoidance and the selection of locations for habitats and laboratories. Humans will be exposed to radiation which can cause sickness or death. Galactic cosmic rays could inflict genetic damage, cataracts and cancer. Shielding must be provided for humans, their equipment and spacecraft, taking into account different types of radiation. Reduced gravity for humans can cause the loss of bone minerals, muscle atrophy and cardiac difficulties. The severity of some effects is increased by longer time spent in outer space. Special medical facilities will be necessary both inside and outside spacecraft. Humans require protection within space vehicles and space habitats and must wear special clothing when they go outside on the Moon's surface. The distance they can safely go from a habitat must be calculated. Studies are required of the psychological effects upon individuals making long flights, living in confined places in isolated areas. Basic needs for water, air and food must be met to maintain productivity. Before humans are launched, information critical to mission success will be acquired by robotics. Finally, Dr. Galloway indicates that NASA has identified seven technologies that must be accelerated: "...regenerative life support, aerobraking, cryogenic engines, surface nuclear power systems, in situ resource utilization, radiation production, and nuclear propulsion needs..."[1] The environments of the Moon and Mars are hostile to humans; the Moon has no carbon, nitrogen, or hydrogen which are needed biologically. There is also lack of water unless it can be discovered in polar traps. ...The aim is to make the Moon as self-sufficent as possible so that dependence on the Earth for supplies will be kept to a minimum... Legal provision would be required for the crew while travelling inside space vehicles to the space station, and

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from there to the Moon, inside lunar habitats, and for flight to Mars. Crews would be composed of highly trained individuals who would have to function with the maximum discipline in order to keep alive and productive. Rules could vary if crew members are national or international in an environment that combines people with machines.[2]

2. Possibilities of establishing a space settlement in a near future.

One approach is to send unmanned cargo to the Moon in 2000 to land a module for habitation and power system. A crew of four persons could fly from the Earth to Space Station Freedom where a space vehicle could be constructed for the crew to reach the Moon in 2001 for 30 days. A second crew of four would arrive in 2002 for six months to begin permanent occupation. By 2006, there would be 8 persons (2 groups of 4) who would rotate every 12 months, operating until 2012 when 12-months tours would begin with four persons. In 2015, a crew of 4 would fly from the space station to Mars, arriving in 2016 for 30 days. A second crew is scheduled to arrive in 2018 and construct the habitat where they could live for 600 days.[3]

Space society should be complete, that is to say, heterogenic, as a means to be able to attain the common good. It is very difficult for homogenic human societies to reach common good because man is imperfect, thus, he cannot attain the common good by his lonely effort. If men are equal, the addition of their lacks and limitations unables them to attain a common goal, in this case, common good individually and socially considered, and the community is a failure.

3. Existing Legal Principles

Space Law is universal. The question is whether a cosmic law should be created; a law with few and simple principles to be developed in each settlement in accordance with its peculiar and singular conditions of life.

Space Law has always related to man's activities in space, the Moon and other celestial bodies, and to the relations created among the astronaut, mankind, the state of launching, the state of registry and the Earth's environment, as well. Today we notice that there is a new field within the **corpus juris spatialis**: the legal relations created and activities performed by mankind in outer space, and celestial bodies. In a few words: Space Law always looked at Space from an Earth-based point of view, now we have to conceive the legal régime for space space, space celestial body, celestial body celestial body, activities and relations and rule activities and legal relations derived therefrom and relating to Earth, as well.

3.1. Are there any principles of the corpus juris spatialis which might be applied to life of man in space - both, outside a space vehicle and in a space station- just as they are established in the five space treaties? Is it necessary to create a new legal régime? In said case, shall each settlement be empowered to create its own legal statute? Is it necessary to give general guidelines within which space settlers shall be able to frame their statute?

3.1.1. Some principles fit perfectly the legal needs of this new situation. The Outer Space Treaty, after determining the benefit and interest of all countries as a goal for space activities, establishes in its Article I, the principle of freedom for the exploration and use of and of access to outer space, the Moon and other celestial bodies for all states. This freedom has a precise subject: states. In the last paragraph, it recognizes freedom for scientific investigation in outer space without any specified subject-

and imposes on states the prompting and encouragement of co-operation in such task. This reference is suggestive. Space activities are shown as sticks of an ever-opening fan and it would be discouraging for private enterprises to be submitted to any previous state authorization or approval.

3.1.2. In art. II the abrogation of the principle of sovereignty is established. It explicitly forbids any national appropriation by claim of sovereignty in **outer space, the Moon and other celestial bodies, by means of use or occupation, or by any other means.**

3.1.2.1. In connection with the principle of jurisdiction and control of the state of registry, some distinctions must be made. Article VIII of the Outer Space Treaty provides that the state of registry retains jurisdiction and control over the object launched into outer space, and over any personnel thereof, **while in outer space or on a celestial body**. The article also refers to objects landed or constructed on a celestial body and of their component parts, when separating the proprietor of said parts and vehicle from the application of the provision.

What political power does the state of registry have in the settlement? Which is the state of registry in a space settlement built using materials taken from the celestial body or brought from another space settlement? In my opinion, there is no doubt with respect to the application of article VIII to space objects bringing materials, crews and elements for the construction of the settlement. But when time passes and the settlement is completed and functioning, cooperation, interchange, and relations among the settlers may complicate the primary situation. Habitational and labor facilities are transformed, a different use to previous existent facilities is given. Let us imagine marriages between settlers belonging to different settlements, confusing their patrimony, maintaining their original working links, and bearing children.

In the absence of sovereignty and of jurisdiction and a control authority, who leads and maintains order within the settlement? I am convinced that the model of states should not be repeated, not even refurbished, in the new civilization. State is power, power is domination, domination is violence, and violence: destruction.

Some time ago I conceived the idea of sovereignty as a service. The historic evolution from the absolute state to the state-manager like system, was necessary for the modern megapolis' development. Authority is given to modern state by the people to allow it to manage common resources and to maintain order in the community's life. Peoples are recovering their original importance and force. This idea could be useful for the government of space settlements: comunitarian administration could be seen as a social duty fulfilled in short periods by the settlers which should be oriented to the common good.

3.1.3. The exploration and use of outer space and celestial bodies with peaceful purposes is a duty imposed in articles III and IV of the Outer Space Treaty, beyond any anti-bellicism. The former obliges states to carry on activities **in the interest of maintaining international peace and security** and promoting international cooperation and understanding. It is not enough to avoid bellic situations or controversial attitudes, it is necessary to give positive and active steps towards peace. Article IV forbids nuclear weapons or any other kind of weapons of mass destruction

(this is not an exhaustive enunciation, ergo, it refers to any weapon) carried by objects in orbit around the Earth or placed on celestial bodies or stations. The installation of military bases, fortifications or testing of any kind of weapon and whichsoever military activity are forbidden as well. Men founding a space settlement must have peace in mind and the conscience of being the creators of a new world where terrestrial mistakes and weakness cannot be accepted. **3.1.4.** The principle considering astronauts as the envoys of mankind -established in Article V of the Outer Space Treaty- should be reviewed. It refers to States Parties as the subjects that shall regard astronauts in that capacity. But this is so only on a space station orbiting around Earth or on a spacecraft travelling throughout outer space. In other words, in a celestial body settlement there are no astronauts but settlers. If each settler on a celestial body community maintains his/her condition of astronaut, a community of envoys would be created. I think space settlers lose their condition of astronauts within the settlement. But in case they undertake exploratory missions to other regions of outer space or other celestial bodies, where no permanent human settlement or manned stations are established, they would recover such condition.Thus, new regulations will have to be defined.[4]

Sterns and Tennen explain the evolution of the settlement's population: the first inhabitants of a settlement will be construction crews which may not actually live in the settlement. These crews will likely be earth-oriented, sent into space for a limited duration of time to conduct particular services. With continued construction, additional facilities of the settlement will be completed. At this time, the first permanent inhabitants will arrive in the settlement...[5] While the settlement is not yet established and completed they consider that crews should be considered temporary residents rather than inhabitants, because each maintains the intent to return to Earth when finishing his/her service.[6]

From this point of view, one may conclude that those first crews would maintain their astronaut -or space passenger- capacity, but when the settlement is completed the settlers would only recover it in off-settlement missions where no permanent presence of man may be found.

A provision like article 1 of the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Space Objects launched into Outer Space, may be amended to allow its application elsewhere the Earth, where no state jurisdiction nor sovereignty exists, in spite of said article considering the emergency or unintended landing of astronauts, on high seas or in any other place not under the jurisdiction of any state. It must be taken into account that the responsible subject of the rescue, and return of astronauts as well as the return of space objects is the State Party. This scope should be broadened in the suggested way to include the settlers as subjects obliged to the rescue and return, provisions as well.

3.1.5. The responsibility for damages caused by space activities to settlements in outer space, the Moon and other celestial bodies, raises a real challenge to jurists. Space Law was focussed to rule the Earth-launching state and astronauts relations, in which Earth (or a State Party), its environment and mankind were the addressees and beneficiaries of space activities.

There is no provision consider-

ing damage caused to persons or property outside a space object in outer space, the Moon and other celestial bodies.

Another problem related to this matter is that the only liable subject is the launching state. It is necessary to foresee the existence of settlements where the original launching state disappears whenever the settlement is completed and definitively established.

3.2. The provisions in the Convention on Registration of Objects Launched into Outer Space seem inadequate to fit the new situation created by the space settlements and the possibility of a launching. There shall not be launching state nor state of registry, the present functions of the Secretary General of the United Nations could be assigned to a future universal agency which would manage the information relating to space objects and their activities.

3.3. The question is still unsolved. Should a new law be created? Are some amendments to the existing space law be enough to adapt the provisions in force to the life and alternatives in human permanent settlements in outer space, the Moon and other celestial bodies, particularly on Mars? Or, finally, why do not we, mankind, establish a few and simple provisions in a **Charter of Mankind in Outer Space**, containing those principles needed by the **corpus juris spatialis** to be applied to and by human settlers to their own problems, life and relations with terrestrial activities, peoples, and the environment?

Law plays the role of gathering the regulations man imposes on himself, either those voluntary adopted or those imposed by the public authority, to achieve order and coexistence in society. Both, individuals and legislators resort to ethics in the search for that order, which the latter transform into laws, and the very individuals, by self-regulation, adopt for their own conducts on deontological codes.[7]

The first generation in space shall keep a strong link with Earth's civilization, but the following generations shall develop their own cultures in different worlds and conditions. An invulnerable chain of principles should be the bridge between human civilizations giving them the sign of human identification through law. Until the present, even the most advanced principles -as the Declaration of the XII Tables on the Rights of Mankind- consider man from a terrestrial point of view. Now we conceive the idea of man being born, living, creating, and reproducing in human space communities where gravity, light, sounds, air, meals, arts and health, among other aspects, are quite different to terrestrial ones. Two principles could be the knot of this newly born society: **affectio humanitatis** and **respect**.

3.3.1. **Affectio humanitatis** is a principle that expresses the conscience of men of belonging to the same gender, sharing the same destiny and creating a common future. Space settlements shall turn up side down the idea of the unique civilization in an unique planet, but something shall remain: mankind is one, wherever it lives, however it develops and -after some generations of adapting to the new environments- whatever it looks like.

3.3.2. **Respect** was the first legal principle we learnt in our childhood. Our parents taught us to respect our fellows, and we did so. The principle was multiplied in many others: the Ten Commandments can be summed up in the principle of respect (and love, as it most perfect expression). Law came afterwards to develop even more this principle, particularly as fundamental and subjective human rights. We learnt to respect, but we did not realize who is our fellow.

Our civilization keeps the concept of fellow closer to the idea of an equal than of a real fellow. In English **fellow** -from Icelandic **felagi**: a partnership; **fe**, property and **lag**, a laying: laying together- originally means a person who shares; partner or accomplice, a companion, a mate. It also means an equal, a person of the same class or rank, peer; either of a pair of similar things used together and suited to each other.[8] There is a word in Spanish to call it: **prójimo** - from Latin **proximus** (the one who is nearest)- this is understood as any man in relation with another, with the charity and benevolence we owe each other.[9] **Próximo** is mother word derived from **proximus**, it is an adjective that means near, very close.[10] In English the word derived from the Latin **proximus**, is **proximate** that means the nearest or next in space, order, time, etc.[11] Thus, if we keep close to the Spanish roots of the concept, we find that fellow is not an equal or similar being, is the nearest, even if it looks different.

In human permanent space settlements respect must be the major principle to be observed by settlers and off-settlement persons and among one another, and between settlers and outer space and celestial bodies' environments. Said principle shall attain its deepest sense in case of contact and further relation with extraterrestrial intelligences, as well as among future human civilizations developed throughout outer space, and celestial bodies.

The principle shall play a parallel role with the essential settlement's autonomy. Autonomy does not mean solitude, it implies own-organization, and respect towards the other fellow. Besides that, it is the exercise of Mankind's right to live in the Cosmos.[12]

4. Space and Mars' settlements: the result of the exercise of freedom.

We are celebrating the Decade of the V Centenary of Francisco de Vitoria's birth. This great jurist created the first principles of what we know as International Law. His ideas expressed when analyzing the legal and illegitimate titles of the Spanish King and the Pope to conquer the New World, may be resumed in two main principles: **ius communicationis** and **ius peregrinandi**. It is wonderful how, five centuries later, we face to similar legal problems. The present **new worlds** are the possibility of exploring and using outer space and celestial bodies, and establishing permanent human settlements there. The legal reason of this right is precisely that mankind has the **ius communicationis** and **peregrinandi** allowing men to travel (communication with physical displacement), to communicate themselves by any means (personally, or by electronic, mechanic or space technology devices). This right has its legal basis in the universal social need of mankind to communicate, and shall be possible only because the 1967 Space Treaty, grants any nation the right and freedom to explore and use all regions of the outer space, the Moon and other celestial bodies.

For this reason, I think that mankind is taking the most free challenge since that taken by Spanish, Portuguese and English navigators when exploring, using and establishing their families in their New World. Mankind has its second historic opportunity, it is on its responsibility the risk of a failure or of finding and creating its own utopia.

The right of mankind to the benefits arising from the exploration and use of the Newest Worlds and its freedom of access to all regions of the cosmos, implies the establishment of permanent settlements, because it includes the right to exploit local resources for common benefit.

The Moon is humanity's first stepping stone on a limitless path into space. It is the first place where people can live with the aid of local resources... A major drive by many people to support the establishment of a lunar base comes directly from mankind's desire for people to be there.[13]

5. Towards the Legal Nature of the Space Settlements: in Space and in Celestial Bodies.

The last decade of this century will see the construction and operation of permanent space stations in near Earth orbits at an altitude of about 400 km for purposes of scientific research, hoping to make progress towards commercial applications of space technology in addition to communication and information processing.[14] The future is here.

The principle of international cooperation shall be of necessary and spontaneous application increased by the fact that in space life depends upon cooperation and mutual assistance.

Human settlements shall be off-Earth human communities. Therefore, they shall need a set of legal principles to build up their constitutional régime and to establish the legal condition of the settlers (founders and born in the settlement).

5.1. Different types of settlements.

There can be several foreseen types of space settlements, depending upon the objective of their creation; calculated duration; from the point of view of its location or emplacement; from the point of view of the settlers.

5.1.1. The settlement shall have a global goal: the common good. And the common good is synonymous with happiness, health, quality of life, welfare, sufficient resources and conditions to allow men to develop their own capacities in order to reach a better social standard in concord and harmony, in peace.

5.1.2. A space settlement may be planned to attain a certain objective, as it may be an experiment of life in a celestial body, bio-medical conditions, research on resources, building a temporary station for arrival and departure of crews with another destiny. But it also may be built to last. The latter choice is the one focussed in this paper.

5.1.3. The place where the settlement may be located is outer space or celestial bodies. It may consist of large space station containing a permanent human settlement in the Earth orbit, as well as in orbit around any celestial body. The possibility may even be considered of moving said station, maintaining its population, according to its purposes or requirements. A space station may as well, become a settlement on a celestial body and abandon the spacecraft or use its components for building the habitat and working structures on the chosen celestial body.

Sterns and Tennen believe that the settlement will occupy a territory in a synthetic ecosphere located in outer space, or on or below the surface of a celestial body.[15] This is the kind of settlement that should be built at first, but when men would have acquired a biological adaptation to the new environment (maybe centuries after the pioneers's arrival), the technological dependency shall be broken and men will be free to stay, work, reside or whatsoever in any place on the celestial body surface.

5.1.4. The population's composition of the settlement is directly linked with the purpose of the settlement's constitution. If it is devoted to develop some special kind of activity, its social

structure shall be composed of persons specialized in the respective field. But it may likewise be composed of people from diverse origins, professions and capacities. And this is, in my opinion, what grants better results.

6. Space settlers and celestial body settlers.

At the very high cost that will be required to transport, maintain and supply the people who will staff the lunar operations, it is important to do everything possible to ensure their continued effectiveness in such an isolated, confined, and barren environment.[16]

Terrestrial space settlers do not lose their nationality nor any other of their terrestrial rights linked with the sovereignty of states. This is also the conclusion of Sterns and Tennen when they state that in the event of an individual relocating to a space settlement with the intention of residing permanently therein, the genuine link with his state of nationality is hindered, but not necessarily broken.[17]

In large space station missions and lunar settlements, which will need a high degree of autonomy, success will be significantly influenced by the ability of groups in the lunar settlements and on Earth to interact together synergistically.[18]

The recent experience of Biosphere 2 is also useful to know the needs, problems, limitations and possibilities of crews living in space stations or in celestial bodies. Dr. Nelson tells us how they needed to minimize reliance on consumable supplies and produce little or no pollution, since they would operate in a close ecological system. He goes on to explain that it is the first project to look at the dynamics of a fully functional life support system with potentially opened operation (being designed for 100 years of operation). Living in space eventually will not be confined to highly restricted environments with a handful of food crops, hydroponically grown, supplemented by vats of algae for oxygen production. Longterm sustainable life is to be found in units called biospheres. If space life is to have enough ecological variety to make it psychologically acceptable, capable of evolutionary development, and with diversity as a safeguard should some of the crops or ecosystems fail, we will live in space biospheres. Little is known so far about how bio spheres operate. If a project like Biosphere 2 had been begun 50 years ago, it would not have been too soon. The knowledge this effort can yield will help people learn to live in harmony with the global biosphere and learn to create minibiospheres for space. This will be required when we make the transition from a spacefaring to a space-living species.[19]

6.1. The new generations. New civilizations.

Another aspect that should be considered is that the generation following the pioneers, shall develop its own culture and way of living not necessary like the terrestrian. The existence of different human cultures in space settlements, shall give rise to new human civilizations, which, by relationing among one another synergistically, will bear cultures absolutely inconceivable at the present, but possible and probable later on.

The environment of celestial bodies with a different gravity, light, lack of air (in the terrestrian composition) will develop a different music, another kind of painting with new colors and materials; another way of dancing. And the same is going to happen with

sports.

6.2. The question of extra-terrestrial intelligence socially organized or not. Relations with human civilizations from Earth, outer space, the Moon and other celestial bodies.

New civilizations will surely be spread throughout the universe. It is not difficult to conceive a contact with extraterrestrial intelligences. Mankind is awaiting that day since many years ago. In December 1987 the Council of Advanced International Studies held in Buenos Aires a Symposium on Extraterrestrial Intelligences. The question of the relationship between human civilizations and extraterrestrial intelligences was considered, and the possibilities of levels in the extraterrestrial civilizations were also enunciated.[20]

The nature of the extra-terrestrial intelligence constitutes a legal problem, if they are not human, for they cannot be legal subjects and, therefore, cannot be entitled to rights. This is, in brief, the question that shows the need of harmonizing both legal orders. Here is where the concept of fellow will play its main role. As humans we always assume that we shall be the strong part in the relation and that our order will prevail. I wonder what reassures us that we are not going to belong to a dog's intelligence level with respect to this supposed civilization. And in the inverse situation: are we going to be acquainted first with the higher intelligence level individuals? And if we discover afterwards that this was not the higher one? Is it not better to respect every individual being in the visited planet or coming to visit the human settlement or the Earth? Maybe law should abandon its anthropocentric ethical framework.

7. Social structure for the space settlers. The alternative between citizenship or social human condition.

There shall be no sovereignty in the settlement, so no citizenship may exist in any state. But social life shall get some legal structure arising from the small human community.

It is necessary to restore the individual as the most important being in the life of society and to recover freedom and social responsibility within a solid and invulnerable sense of ethics. And, finally, it is fundamental to bear in mind that man has a unique opportunity to make his own utopia a reality. Small communities, where man retrieves his identity, importance and social weight. Fewer and clearer rules, closer to natural law than to a reglamentarist positive order, might be the shape of this manmade paradise.

CONCLUSION: CHARTER OF PRINCIPLES FOR MANKIND IN OUTER SPACE AND CELESTIAL BODIES

Preamble

We, Mankind:

Recognizing our unity in gender irrespective of the place of origin, establishment, residence, or shape of the persons,

Convinced that outer space, celestial bodies and their natural resources are our common heritage,

Taking into account that the level of technology developed in our present civilization is powerful enough to assure our common welfare as well as our destruction,

Bearing in mind that our future, preserved from destruction by causes other than natural, depends upon our will and human values,

Desiring to guarantee peace and survival to our gender,

Recognizing our active role in the exploration and use of outer

space and celestial bodies, and,

Foreseeing the establishment of permanent human settlements in outer space, the Moon and other celestial bodies,

Agree on the following:

Principle I

Mankind is unique, and its unity must never be broken. It is free to explore outer space and celestial bodies and to use the natural resources therefrom because they are its common heritage.

Principle II

The principle of respect to every being in the cosmos must be permanently observed. The exploitation and uses of natural resources must respect their preservation and avoid contamination, expoliation and any kind of deterioration of the environments.

Responsibility for damages caused in outer space, the Moon and other celestial bodies, to any non-human being shall be objective and absolute; any damages caused to human persons or their properties shall entail absolute responsibility based upon fault. The settler shall be liable for any damage caused in human relationships. The settlement as a whole shall be liable for any damage caused to the environment or any being other than human or its property.

Principle III

Solidarity and cooperation among different civilizations, are universal social duties; and common good is a goal of peace. These shall be priorities over any local interest.

Principle IV

All human activities both in space and on celestial bodies, must be carried out with peaceful purposes and in the common benefit. The test, use, or allocation of any kind of weapon in space, space objects or on celestial bodies, is forbidden. No exceptions may be introduced to this principle.

Contacts and relationships with intelligences or civilizations other than human must be always peaceful and by no means nor reason be aggressive. Peace must be promoted for the harmonization and integration among different cultures.

Principle V

Contacts and relationships with intelligences or civilizations other than human must be framed within the principle of respect to their lives, health, beliefs, properties, knowledge as well as to every expression of their culture.

Principle VI

Universal integration in peace must be a permanent common aim.

Principle VII

Human settlements in outer space or celestial bodies must keep permanent residents to a minimun number, for their development in small communities, to allow individual integration and personal social responsibility.

Principle VII

Human communities in outer space or celestial bodies shall be ruled by these principles which must be developed in each settlement or station.

Principle IX

The rules derived from these principles shall be elaborated in each settlement, by a collegium of senior permanent residents, who shall offer the community their experience during their lifetime.

Principles and rules shall be applied by a forum composed of nine of the senior permanent residents, chosen among the members of the collegium and developing their task during short periods.

The government of the communities in outer space and celestial bodies shall be held in turn by permanent residents, during short periods, and in accordance with their personal capacities. Government functions shall be limited to administrate the common natural resources and to undertake measures towards guaranteeing health and the common good within the settlement. Each administrator shall respond, when finishing his/her term, to the collegium of senior residents for

ünlawful acts or abuses during his/her mandate.

The functions in the **collegium, forum**, and the administration, shall be social duties.

No sovereignty must be recognized nor claimed over human communities, either in space or celestial bodies.

Principle X

Person trespassing any of these principles, once proved, shall be set apart from his/her community and may even be left to his/her own fate.

FOOTNOTES

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