

Mission to Mars: Medical and Legal Aspects of the Protection of Human Rights to Life and Health During Long-Lasting Space Missions

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The article deals with the delay between the evolution of functioning of the body and the social revolutionary transition from the Earth people towards Space people. As a result of this natural phenomenon, the legal protection of human rights to life and health for the human explorers of outer space is needed. This need is encouraged by the plans of certain governments and private space companies on accomplishing the mission to Mars in the middle-term perspective. The article follows the scientific proposals to update legal responsibility of states to ensure the life and health of astronauts and space tourists sent by them. The article applies general and special scientific methods to comprehend and study social and legal phenomena and general logic reasoning (abstract reasoning, analogy, analysis, generalization, etc.). Consequently, the article authors conclude that the UN should adopt the Declaration on Human Rights in Space to formalize the legal protection of human representatives sent to space.

Keywords: human rights, life and health, legal protection, space, Mars, envoys of mankind.

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Introduction

There would be a long and full of marvellous experience, joined by the multiple threats for human lives and health, the way towards Space People. This path would be defined by both the breakthrough achievements of the Humanity and human genetic evolution. Nonetheless, at any given stage the human rights, especially the rights to life and health, of the space explorers should not be violated.

Humanity is at the early stages of conquering outer space. Consequently, governments and private companies should provide the rights of life and health for the crew members of the space exploration missions.

This issue of the provision of the rights of life and health for people on space exploration missions is the article's primary focus. The basis for the research is laid by the scientific bio-medical research on the environmental factors influencing the astronauts' health (Urrutia, 2020; Coady, 2017; Roberts et al., 2019) and the space legislation in effect (Treaty, 1967; Agreement, 1968).

There is an overview of international and Ukrainian national legislation regarding human rights of life and health protection during the outer space missions in the first part of the article. It was made clear that the regulation of this matter is regulated by the international norms of the space law (Treaty, 1967; Agreement, 1968) and the national space law of some countries (Hoda, 2021). Nonetheless, both international and national laws have imperfections and gaps and cannot ensure the natural rights of humans during long-lasting space exploration missions. They require both theoretical development and implementation of new legislation.

The second part of the article discusses the challenges for humanity in the protection of the rights of life and health of people in space during the long-lasting space missions. The conducted analysis of the available studies proves the existence of a number of life and health threats for

the astronauts on a long-lasting space exploration mission beyond the electromagnetic field and microgravity of the Earth. Therefore, before sending people for the long-lasting space missions there is a need for sound theoretical and applied research, for instance, sending and welcoming back a few Missions to Mars with living creatures.

The third part of the article is devoted to human evolution on the way from being a living creature born on the planet Earth towards the space living creature. It is made clear that such transition from Earth-living to space-living would not cause an immediate positive effect on our physical body. Nevertheless, in the long run the unfavorable space conditions would enhance not only the intellectual development but also the physiological evolution of the human organism. Therefore, the majority of humans would be able to live outside the Earth planet. There would be a protracted transition period. Before humanity had adapted to the space environment, the studies should be conducted in a steady and evolutionary manner. In general, as of now, we suggest limiting the time people can spend in outer space to protect their rights of life and health accordingly.

The fourth part of the article identifies the threats for people on missions to Mars and the legal framework that should be in place to protect human rights of life and health. There is an overview of the life-threatening factors of the open space and the environment created by Mars' surface that is not favorable for living on the planet. The importance of the further research, using pilotless spacecrafts with and without biological material on it, is stressed. It is proven that the safety issues of the mission to Mars with people on board are caused not by technological flaws but merely by biological, humanitarian and legal obstacles.

In conclusion, the authors stress the importance of the UN to adopt the Declaration of Human Rights in Space as the governing international law in the space legislation field.

The state of the field in international and national legislative regulation of human rights of life and health

According to Article III of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies from the 10th of October 1967, the activities should be conducted “in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding.” According to Article V, “States Parties to the Treaty shall regard astronauts as envoys of mankind in outer space and shall render to them all possible assistance in the event of accident, distress, or emergency landing on the territory of another State Party or on the high seas. When astronauts make such a landing, they shall be safely and promptly returned to the state of registry of their space vehicle (...) States Parties to the Treaty shall immediately inform the other States Parties to the treaty or the Secretary-General of the United Nations of any phenomena they discover in outer space, including the Moon and other celestial bodies, which could constitute a danger to the life or health of astronauts” (Treaty, 1967).

This Treaty was further developed and supported by the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space from the 3rd of December 1968. It states that “each contracting party which receives information or discovers that the personnel of a spacecraft have suffered accident or are experiencing conditions of distress or have made an emergency or unintended landing in the territory unders its jurisdiction or on the high seas or in any other place not under the jurisdiction of any State

shall immediately: (a) notify the launching authority or, if it cannot identify and immediately communicate with the launching authority, immediately make a public announcement by all appropriate means of communication at its disposal; (b) notify the Secretary-General of the United Nations, who should disseminate the information without delay by all appropriate means of communication at his disposal (...) It shall immediately take all possible steps to rescue them and render them all necessary assistance” (Agreement, 1968).

Thus, astronauts are first of all “envoys of mankind in outer space.” Nevertheless, that does not imply that they lose their legal bond with the nation they hold the citizenship of. Accordingly, humans in space retain all rights and obligations occurring from their citizenship. Moreover, the laws of the nation that has registered a space vessel should be followed and respected by the workers and travelers on it. Astronauts are perceived as “envoys of the mankind” and also hold their citizenship status. Consequently, humans in space and their rights of life and health are protected by both international law and the national law of the countries whose citizenship they hold (de Gouyon, 2019).

For instance, in the USA, an astronaut was considered a human traveling or preparing (going through the training program) to fly beyond the Earth’s atmosphere (Hoda, 2021). According to the Cambridge Dictionary, an astronaut is “a person who has been trained for travelling in space” (Astronaut, 2021). We see that the first and the second definition of the legal status of astronaut do not match. The first one states that an astronaut is any person who is professionally or by any other means is being prepared to fly beyond the Earth’s atmosphere. The second concerns only a person who is professionally trained for travelling in space. The second approach is supported by the Russian scientists. They relate a status of “cosmonaut” to the job functionality. The legal status of cosmonauts is thus seen through the lens of professional activities during the space missions (Baturin, 2020).

Recently, as the reaction on the wider spread of the commercial suborbital flights there has been a proposal to call people who have been trained and are conducting scientific, educational, media, civil functions on the board of a spacecraft as “private astronauts” instead of labeling them as “space tourists” since they are civic explorers of space environment (Tumlinson, 2021).

A great example of this is the first Jeff Bezos’ flight on the reusable suborbital rocket system New Shepard. He could not be considered neither a crew member nor a human who contributed to the safety of the human space flights during the flights. Due to these reasons, he and other people who were on board of SpaceX Crew Dragon and Virgin Galactic SpaceShipTwo were rejected to be awarded commercial astronaut wings. In total, there were 15 people, including Richard Branson and Jeff Bezos, who took part in the private spaceflights. All of them did not receive commercial astronaut wings from the FAA. Later, the Federal Aviation Administration adopted the decision that all people who were in space on board of private spaceflights as passengers during 2021 would still be awarded (Hoda, 2021).

There are not so many differences in the status of people in space for the purposes of our research as we are interested in developing a legal framework to protect any human who is out the Earth’s atmosphere. In our opinion, people in space could be divided into three main categories:

1. Paid professionals who navigate space vehicles and (or) conduct scientific research in space. According to the tradition of the country which they represent or the flag on the board of the space vehicle, they could be called astronauts (the USA), cosmonauts (Russian Federation), taikonaut (PRC), etc.

2. Private researchers (private astronauts) who conduct space scientific research provided by private entities or their own means.
3. Space tourists.

In general, both international and national norms of legal protection of human rights of life and health are at the early stages of their development. They have imperfections and gaps and cannot ensure the natural rights of humans during long-lasting space exploration missions.

The challenges for humanity in the protection of the rights of life and health of people in space during the long-lasting space missions

As of now, private spaceflights are at the active development stage. Private entrepreneurs target their efforts towards the colonization of the neighboring planet Mars. There are objective factors influencing such a situation. First of all, it is the nearest planet to the Earth, and moreover, the short-term stay of the living organisms, probably including people there, should not cause real-life and health threats.

However, the research of the state of health of astronauts who spent a long period of time in space, even in the suborbit (400-500 km) shows that it causes bad effects on them and requires long recovery after that (Hofman, 2014). This happens disregarding the fact that at the suborbital heights astronauts were under almost full protection of the Earth's magnetic field, and their organism is still so close to the Earth's surface that there is a micro-gravitation and people feel it (Urrutia, 2020).

Scheduled missions to Mars and to the other locations with the need of the long-term stay in outer space require a profound understanding of the effects of space flights on human bodies and behavior. The studies conducted during the last decade have shown two related influence patterns of spaceflights on human organisms and behavior. They are dysfunction and adaptive plasticity. The evidence shows that space factors during the spaceflights are unfavourable environment for humans in general and their brains in particular (Hupfelda et al., 2021).

There are analytical studies of the impacts of long-lasting space missions on human health to be addressed. American researchers made brain MR imaging scans of NASA astronauts to retrospectively analyse structural pre- and post-flight changes. They compared structural changes with cognitive and motor functions and came up with the following results: long-lasting spaceflights aboard the International Space Station resulted in a significant increase in total ventricular volume. In addition, long-duration spaceflights resulted in significant crowding of brain parenchyma at the vertex that correlated with the motor tasks completion time. "These findings suggest that brain structural changes are associated with changes in cognitive and motor test scores and with the development of spaceflight-associated neuro-optic syndrome" (Roberts et al., 2019).

Hence, there is no doubt that long-lasting space missions are dangerous for modern humans even if they are close to the Earth's magnetic field and microgravity (400-500 km on the suborbital height). The danger of the life and health of astronauts outside the Earth's magnetic field and microgravity could be tremendously higher. Although, there are only hypotheses on the possible rate of harm during the long-lasting space missions, since apart from the short-term travels to the Earth's satellite Moon, there were no other destinations of the human space travels. Before sending people for the long-lasting space missions, there is a need for sound

theoretical and applied research, for instance, sending and welcoming back a few Missions to Mars with living creatures (from unicellular organisms to those whose genetic structure is approximate to humans). These issues require legal regulation based on the national legislation of the space nations capable of conducting space missions. Consequently, these efforts to be supported by the norms of the international space law, adopted by the UN and ratified by the sovereign nations.

Human evolution on the way from being a living creature born on the planet earth towards the space living creature

Contemporary science proves that multicellular organisms went through their evolution (revolutionary mutations) nowhere else but the planet Earth. There are ongoing discussions on the origin of the unicellular organisms on our planet. This does not have much relevance for our research since *Homo sapiens*, according to the prevailing scientific theory as a living species, appeared as the result of the revolutionary mutation around 200 000 years ago. There are still opposing theories. Some claim that it was a steady evolutionary process for many people that lasted during 400 000 years (Hublin et al., 2017). For the purpose of our research, there is not much difference because in both cases, it is just a tiny period of the total life development. The Earth and its biosphere have dramatically changed during the last 4.5 billion years. The challenging life conditions appeared approx. 600 million years ago. During the first two billion years (4.5-2.5 billion years ago), ecosystems were solely dominated by microbial communities (Stüeken et al., 2020). Nonetheless, we due to the evolutionary changes, natural selection, revolutionary natural and social transformations have managed to achieve a great success within such a short period of time. Our success is much greater than any of other living species have ever achieved (Bakker, 1986).

It's noteworthy that the main evolutionary transformations of our ancestors were made during the first 100 000 years. The public and legal stage of human development enhanced social, scientific, humanitarian and technical development within the last 5 500 years.

We should stress again that the basis of human evolution is the development of the brain. The brain is the primary repository and building block of our experience and reality (Holloway, 2008).

Human brain is one of the most complicated and fascinating organs that has ever been developed. Progressive enlargement of the hominid brain started about 2.5 million years ago, most probably from an australopithecine form with a brain size comparable to that of a modern chimpanzee. Lately a threefold increase in endocranial volume has taken place. That has lead to one of the most complex and efficient structures known in the animated universe, i.e., the human brain. The evolution of the human brain is mainly explained by focusing on selection pressures of the physical environment (e.g., food and its availability, climate) and the social environment (e.g., size of the group, formation of the coalitions, parental care) (Hofman, 2014). We believe that the further development of the hominid brain would be enhanced by the need to adapt to work, life and rest in outer space where there are no protection properties of the Earth's biosphere.

Nevertheless, one should note that at the present stage of evolution, human presence in the outer space has a negative effect on the astronauts' health. For instance, it was proven by Steven Jillings, a doctoral student at the Lab for Equilibrium Investigations and Aerospace (LEIA) at the University of Antwerp in Belgium. He and the team studied the brains of 11

cosmonauts before their spaceflights, then again nine days after landing, and then again six to seven months after their return to Earth. This allowed scientists to have a more in-depth look at the brain landscape and see how spaceflight has really changed it. They concluded that the human body was designed to function under the Earth's gravity, so many of its parts have evolved to respond to the downward pull. These biological systems change when humans (and other mammals) spend a reasonable period of time in the Earth's orbit. The microgravity environment causes a sensation of weightlessness to appear. The first few days in outer space disorientate the space crew members and the lasting impact of the microgravity means they will need a period of time to re-adopt to the gravity when they are back on the Earth. They found that cosmonauts who had served six-month missions on the ISS experienced upward shifting of their brains, and that the fluid found around the brain and spine redistributed as a result of being in microgravity. Steven Jillings proves that various MRI techniques in future related research could help scientists get more information about the brain in space, like whether or not spaceflight causes any structural change to the brain itself (Urrutia, 2020).

The further transition of people into outer space should lead to a certain degree of human evolution. This would be caused by the fact that the space environment is aggressive towards humans and is the unfavorable natural environment. The fact that a large amount of people would have to spend their time there would ultimately lead to the adaptation to it. The evidence for such a statement is given by the scientists who believe that the leading positive effect on brain size was caused by the unfavorable natural environment conditions. However, there are objective limits to the growth of our brain in the future.

The human brain evolved from a number of the basic structures that limit the size and the amount of information that it can store and process. It means that internal factors of brain design could be the main determinants constraining the evolution of the brain. The new functional organization of the brain does not immediately evolve in response to specific environmental conditions (Hofman, 2014).

Therefore, the transition of human habitat from the Earth to space would not immediately cause the positive effect on a biological organism. Nonetheless, we are sure that unfavorable conditions in the long perspective would be the primal cause for not only the intellectual development but also for the physiological change in terms of the density of neural connection in our brains and the increase in the size of the brain. Importantly, that to implement a positive change in a natural way, the long amount of time is needed. The natural evolution of the living nature is reasonably slower comparing to the revolutionary changes of technologies, social and humanitarian systems where people achieve change within quite limited amount of time. Human evolution is really a slow process that would keep lasting for decades, hundreds, thousands and millions of years. Thus, rushing to send people to the long-lasting space missions would not be a smart thing to do. We have no doubts that humanity will live out of the planet Earth in some time. We are at the early stage of this process. This process could be enhanced by genetic engineering. However, in the majority of countries that have the potential to do so, experiments on human beings are prohibited.

Consequently, before humanity has adapted to the space environment, its exploration should be conducted steadily and in an evolutionary manner. The approach here should be a simple one. As of now, we have mastered the living of astronauts on the suborbital hight. The short-term missions to the Moon are the next step. Meanwhile, an artificial electromagnetic Earth field system, gravity and ozone layer emulators should be created. This would steadily increase the time human missions can spend their time on the Moon. This will slowly allow

(in a span of decades) to move to the concept of the space isles that would rotate around the Sun at a close distance from our planet. These all measures together with the applied research of missions to Mars and back with the living creatures on board would ultimately be allowed human missions to the Red Planet. The further steps of exploring the Solar system and beyond we cannot analyse so far. Otherwise, we will move from scientific research to the sci-fi story. We have too many scientific gaps here. We are confident that there would be a point of time when people would be able to travel to the neighboring planetary systems.

Above-mentioned information leads us to the conclusion that we should lay the legal limitations for the duration of human stay in outer space to protect their rights of life and health. These limits should be correlated with the technical capacities to create emulators of artificial electromagnetic field of the Earth, gravity and other protections needed to protect a human on board of space vehicles (isles) in outer space. The lesser requirements could be applied only for the short-term stays and to foster the steady evolution of human organisms so that they could adapt to live and work beyond the Earth atmosphere.

The threats for humans on missions to mars and the legal framework that should be in place to protect human rights of life and health

NASA and certain private space companies plan on sending humans to Mars by 2030th. This is an ambitious plan of the return flight. It is planned that such missions would last from three to six months. Moreover, it is expected that the crew would stay on the Red Planet for up to two years period before the planetary situation would allow them to come back (NASA's, 2014). This means that astronauts would have to live under the conditions of the lower gravity (microgravity) for a period of approximately three years. That would greatly exceed the top non-stop stay in the space of cosmonaut Valery Polyakov, which is 438. The majority of the technical issues related to the mission are at the development stage (Stofan, 2016). However, we believe that the medical and legal issues to protect human rights of life and health of the astronauts during the mission to Mars lack attention. We believe that technical issues will be successfully solved. The main thing is not the technical possibility to send and welcome back the space vehicle on the mission to Mars but to overcome the effect of negative space influences.

Thus, according to the scientists into the space medicine field, the main negative natural factors that would affect the crew members of the mission to Mars are:

- a) The influence of microgravity on the human organism (or the relative absence of it);
- b) The absence of the protecting Earth's electromagnetic field;
- c) The absence of the protecting ozone layer.

These are the main issues. However, there probably are more of them since there is a lack of time, and too few astronauts have been studied to understand the effects of outer space on human health.

The danger of the lack of gravity in outer space and very low gravity on Mars is the most studied one. It is a great issue since humans went through evolutionary development to exist with the Earth's gravity and not with the absence of it in outer space or with the low gravity on Mars. Biomedical scientists have proven that human brains have difficulties to cope with microgravity even though the data is scarce. They report that astronauts' faces become red and inflate with the absence of gravity. This effect is tenderly called after cartoon character

Charlie Brown or else “Bird-legs Syndrome.” It is caused by the liquid (mostly consisting of blood cells and plasma) and stroke volume is moving to the head that causes puffiness in the face, and the legs are losing the volume. Such a liquids’ shift is related to space motion sickness, headaches and nausea. Recently it has also been connected with blurry vision caused by the increased pressure because the blood flow in the tissues increases and the brain is lifted inside the skull. These are abnormalities with the astronauts’ vision and are known as increased intracranial pressure. Even though NASA considers this as the highest health-related risk for any mission to Mars, it is still unclear for the medical scientists what exactly causes it and, what is even more important, how to overcome it (Urrutia, 2020).

Another issue is the negative impact of outer space on the human vestibular system. The otolith, located inside the inner ear, allows the brain to receive information that tells it how the head is oriented. Small crystal structures “Otoconia” create an Otolith that lies flat on top of a gel in the human’s inner ear. Thus, when the head makes a movement, i.e., tilting down to one shoulder, gravity pulls the otoconia down across hairs within the human’s inner ear. These movements are sending a signal to the brain, meaning the head has tilted. However, even though the head changes position in microgravity, there is still not enough gravity to tell the brain. “The first several days in space are disorienting for space crew members, and prolonged exposure to microgravity means they need a period of readjustment to gravity when they come back down to Earth” (Urrutia, 2020).

Additionally, there is an issue that the soil on Mars is not suitable for bacterial life and agriculture. Moreover, according to the estimations of biologists, Mars’ soil is dangerous for human life and health (Coady, 2017).

A separate issue is the giving birth to children on Mars. Right now, scientists are not aware of how to make it possible. However, there are sound scientific works on the issue concerning space stations’ environment. They stress the fact that giving birth in space is a challenge. First of all, because of the absence of gravity, it would be inconvenient for people to have sexual life in space. Even if they succeed, it would be just a minor problem. Secondly, human sperm cells need gravity for migration to the female’s egg, which would make it even more difficult for the egg to be successfully fertilized in space. Thirdly, it is more difficult for the embryo to mature into a baby since there would be a changed flow of fluids from the mother’s body to the embryo. After the possibly successful delivery, the main issue would be to comfort the baby to sleep. For children born in space, the return on the Earth would be harmful to experience local gravity. Similarly, mice born in space that have been studied had fewer problems in accustoming to weightlessness, although they had a very hard time coming to terms with balance. Babies born in space would look a bit different in cosmetical terms. Humans born there would develop bloated bodies and puffy faces. Since the heart doesn’t have to work against gravity in space, it would atrophy, and we would lose blood content, making us paler and weaker. Since their hearts are not used to the Earth’s gravity, they will have increased blood pressure in the upper bodies, their eyes would bulge and their brains would lose efficiency. The effects of the radiation levels that could be possible due to the prolonged stays at the ISS were studied on mice. They have shown an increased probability of suffering from Alzheimer’s disease. Moreover, the astronauts on the ISS have experienced a degradation of their immune systems and had fewer white blood cells (Gupta, 2021).

The biological challenges of dangers of outer space and the unfavorable nature of Mars’ soil for life on Mars mean that to protect human rights of life and health, mission on Mars

should be temporary legally banned. To allow the planned mission to Mars additional scientific research is required both robotic flights and with living creatures on board to fly there and back for the sound research. It would be an inhuman step to send people on a mission to Mars before finding the proper protection against unfavourable factors of outer space on the DNA similar to human DNAs.

Thus, today's obstacles of the human mission to Mars are not of technological nature but of biological, humanitarian and legal origin. The primal one is an effective legal protection of human rights of life and health in outer space.

Recent achievements and increased investments in human spaceflights have speeded up the terms of making the human missions in outer space, including those to Mars, possible. The success of such missions depends on the capability of managers to ensure the health and efficiency of people. Keeping motor, somatosensory and cognitive functions is of great importance for fulfilling the tasks on the board of the space vehicle, so the integrity of the Central nervous system (CNS) and the brain are in the focus of scientists. The observations of the spaceflights have reported decrements in operational performance. Crewmembers of the short-duration Apollo-era missions had reported altered driving performance on lunar excursions. More to that, during the first 100 Space Shuttle Missions, 20% of orbiter landings were outside acceptable limits. Observations also noted in-flight performance decrements aboard Mir and the ISS, including several close calls and one collision between a vehicle and components of the space station. Even though current and future generations of NASA spacecrafts have been prepared for autonomous flight, the crew must be capable of manual operation of the vehicle if the automatic control fails. Previously conducted studies have reported changes across multiple neurologic domains, including changes to sensation, movement, coordination, and cognition after spaceflight. For instance, a major potential cause of performance decrements during spaceflight was said to be sensorimotor dysfunction. Sensorimotor deficits observed during and after spaceflight included: reduced fine motor control, impaired gaze control, impaired coordination, loss of motor efference, postural ataxia and spatial disorientation. Whereas these changes are greatest immediately after gravitational transitions, it is noted that the extent and duration of some alterations have been associated with increased duration of the mission: e.g., poorer landing accuracy in the pilots of Space Shuttle was associated with longer mission length and greater extent of vestibular dysfunction, as seen from the post-flight assessments. It included vestibular deprivation, zero gravity and shifts of head liquids. Additionally, there is more evidence of other factors influencing the brain during spaceflights: isolation and confinement, space radiation (Roy-O'Reilly et al., 2021).

Based on the empirical evidences we believe that human long-term space missions beyond the Earth's electromagnetic field and gravitation should be regulated by national laws of space club nations who have the possibility to conduct such activities and should be framed by the norms of international space law. In our realities these requirements concern the mission to Mars.

The declaration of human rights in space

The primal humanitarian value is human life and health. Everything else, including scientific achievements and private individuals' ambitions, is of secondary importance. Therefore, before the issue of the biological and legal protection of crewmembers, sending a human mission to Mars would be an unbalanced decision.

Having said that, we are not against the transition of humans from the Earth to space reality. This is a natural and inevitable process. But to implement it, the rights of life and health of the mission's crew members have to be legally secured. It was repeatedly proven that the legal regulation should start from the national level and then lead to the UN's Declaration of Human Rights in Space. After it would be ratified by sovereign nations, it would lead to the unification of national legislation in this sphere.

There is already the Universal Declaration of Human Rights as a foundation for the new document. The existing Declaration, according to Léopold Eyharts, Astronaut of the European Space Agency, "has found it's a symbolic place among all peoples of the world" (Universal, 2018).

The issues of ethics and human rights correspond to the aims of the Space Treaty of 1967. With the support of the Space Generation Advisory Council (United Nations Public Service Awards) and The Office of the United Nations High Commissioner for Human Rights, there is a working group on ethics and human rights that particularly works on the space issues. According to its specialists space technologies can have a great impact on meeting the UN sustainable development goals. The developed project of this group can become a platform to ensure the rights, justice and capabilities of different nations that have space ambitions and would help to envision its development so that the whole humanity is represented in space. It works on developing the list of human rights in space, provision of sustainability and ethics in space (Ethics, 2021).

The development of the Declaration of Human Rights in Space should be based on the following principles:

1. A commitment to the rights of all humans and respect for the moral standing of the living creatures and systems with whom we share our planet;
2. A commitment to a non-exploitative relationship with the Earth, space, and any potential non-Earth life-forms for the sake of scientific and peaceful collaborative exploration;
3. A commitment to non-proliferation of war or conflict on Earth or in space, and critical engagement with any potential partners whose activities expand or worsen conflict;
4. A recognition of the priority of Earthly processes over space ones;
5. A commitment to the recognition of space exploration as fundamentally nested within, and driven by, dominant political and socio-economic power-relations on Earth and the need to embed efforts to advance ethical space activities with their rightful social contexts (Ethics, 2021).

Conclusions

Human development is closely tightened with two basic factors: (1) genetic heredity and (2) public and legal reality. They are constantly developing, although the latter one is much more dynamic. The dynamics of heredity are governed by the million years of evolution with rare mutation that steadily changes the original biology. The public and legal reality also follows the evolutionary path but with a much greater rate of revolutionary changes.

We observe the social revolution of human transition from the Earth creature to the Space creature in modern times. The evolution of the human physical bodies happens much slower. Therefore, the issue of the protection of human rights of life and health of envoys of mankind

become the leading factor influencing the development of national and international space law. Especially since certain nations and private space companies have mid-term plans to send human missions to Mars.

Thus, to portray and solve the identified problems of long-lasting space missions and to prevent the violation of human rights of life and health of envoys of mankind we have suggested changes for the international space law. It could be implemented in the UN's Declaration on Human Rights in Space as a fundamental international space legal document that would influence national space legislation on long-lasting space missions.

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