The Impact of Cosmic Ideas on Humankind: Past, Present and Future Narratives.

Jeanna Kolesova

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1 The relation of Upper Paleolithic art to cosmic ideas

The presence of humankind in outer space began with the launching of the Soviet satellite *Sputnik I* into the Earth orbit on 4th of October 1957. It set the stage for direct exploration of the solar system and far cosmos, which is only gaining momentum at this point. At the beginning of the Space Age the question of why are we going into space or how it came about appeared. People involved in space exploration found their answers to this question based on their speciality or background, whether in geopolitics, business and science-engineering.[1] But the phenomenon of space exploration did not appear as something sudden or obvious, because such fundamental ideas can only be based on a long and interwoven development processes to which many factors contributed – historical, mythological, socio-political, intellectual, scientifical, psychological, international among others.[2]

The US archeologist Alexander Marshack questioned the moment of how and why the space age has developed and what it meant. In his research he refused "suddenlies" in historical research of the origins of evolved civilizations and cultural innovation:

> Egyptian calendar was based on a solar day count and a stellar astronomy, the start of the solar year of 365 days being the morning on which the star Sirius first appeared in the eastern dawn sky, around 19 July [...] The early Hindu calendar was lunar, with observations of sun and stars helping to measure and determine the seasons and year. The early Chinese calendar contained observations of both sun and moon but also seemed based on an ancient tradition that was primarily lunar [...] calendar of the Central American Mayans was solar, but the Mayans had developed a late, historic culture and there are indications of basic, earlier lunar calendar among the South and North American Indian tradition. [...] In each of these

[1] Messeri, Lisa. *Placing Outer Space: an Earthly Ethnography of Other Worlds*. Durham: Duke University Press, 2016
[2] Marchant, Jo. *The Human Cosmos: A Secret History of the Stars*. Edinburgh: Canongate Books Ltd, 2020

> developed agricultural civilisations is evidence of an early lunar observation and calendar. These hints did not seem to me that agriculture had led to the calendar, but rather that agriculture and the calendar were products of an exceedingly long development in human culture.[3]

Marshak surmises human activities, science for instance, as a "time-factored" and goes back all the way to the Ice Age. Microscopic examination of markings on bones and stones fragments made by people in the Upper Palaeolithic from different regions led him to the conclusion that this was the form of "counting". Further analysis of the pattern showed that it could be related to a time count and lunar count and the first known lunar calendars, which Palaeolitic people used for tracking natural periods such as dry or rain seasons, migration of animals or seasonal recognition.[4]

The cave of *Lascaux* (near Montignac, France) is one of the most famous examples of prehistoric paintings. The most well known are portrayals of animals in the *Hall of the Bulls* dating from about 17,000 BC. The interpretation of the paintings is still a source for disputes: some theories describe it as a past hunting success, some as a ritual for future hunting endeavors, some as a spiritual place. But these theories failed to explain the puzzle of surrounding one of these animal figures.[5] *The Bull No.18*, the largest painting in the whole of cave drawings, has a strange figure above the animal's back - a cluster of six floating points. In his investigation on this cluster, astronomer Michael Rappenglück concluded that the six points are the star cluster the *Pleiades* - one of the first constellations which figures in the myths of many cultures.[6] Beneath the *Pleiades* lies a group of stars which has been known as the constellation of *Taurus*: the star *Aldebaran* was used to mark the right eye of the bull and another cluster of stars, the *Hyades*, forms the V-shape head of the bull. Rappenglück calculated how *Pleiades, Hyades* and *Taurus* would have looked around 17,000 BC and compared this

[3] Marshak, Alexander. *The Roots of Civilization: Cognitive Beginnings of Man's First Art, Symbol and Notation*. New York: Moyer Bell Limited, 1991, 12
[4] Ibid., 27–33, 125–146, 219–234, 277–280
[5] Marchant, Jo. *The Human Cosmos: A Secret History of the Stars*. Edinburgh: Canongate Books Ltd, 2020, 5–24
[6] Rappenglück, Michael A. "The Pleiades in the "Salle des Taureaux", grotte de Lascaux. Does a rock picture in the cave of Lascaux show the open star cluster of the Pleiades at the Magdalenien era (ca. 15.300 BC)?" in *Actas del IV Congreso de la SEAC "Astronomía en la Cultura"*, Universidad de Salamanca (1997): 217 – 225

measurement with painting in the cave: Pleiades were slightly higher above the bull's back and Aldebaran was more clearly framed by Hyades.

> The position of the Pleiades [...] was continuously used in ancient times to define the origin of elliptical divisions, the socaled houses or stations in the different zodiacs which were used by the ancient civilizations. For example in China and India the six stars represented the starting point of the lunar zodiac at the vernal equinox around 2300 BC. The second station of the Indian moon zodiac is incidentally called *rohine*, "the red, the red-like", which refers to a red cow, the star *Aldebaran*. 15.000 years earlier a very similar distribution could be seen in the night sky, only with opposite position: at the same time the Pleiades, the open cluster of six stars marked the autumn and was therefore the main constellation of the spring. Their disappearance signalled the approach of autumn.[7]

In the Upper Paleolithic Pleiades, Orion and other comic motifs appear in different regions of Earth in apparently unrelated cultures. Phylogenetic analyses of protomyths such as Cosmic Hunt, when an animal chased into the sky and transformed into a constellation, dates the existence of if before 15,000 BC and shows spreading through migration from Europe to North America. Myths and cosmic motifs connected with Pleiades are frequently inherited rather than borrowed from close neighbors.[8]

Some researchers show evidence of shamanic practices and think that caves, such as Lascaux, were used as a spiritual place for transcendental journeys to the "Upper World".[9] Others propose that it is a representation of the cosmos as a whole and of the spiritual connections associated to it.[10] Even with a scientific approach it is impossible to

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[7] Ibid., 223
[8] d'Huy, Julien; Berezkin, Yuri E, "How Did the First Humans Perceive the Starry Night? – On the Pleiades" in *The Retrospective Methods Network*, University of Helsinki, Double Issue 12-13 (2016-2017): 100 – 123
[9] Lewis-Williams, David. *The Mind in the Cave: Consciousness and the Origins of Art*. E-book: Thames & Hudson, 2004
[10] Rappenglück, Michael A. "The Pleiades in the "Salle des Taureaux", grotte de Lascaux. Does a rock picture in the cave of Lascaux show the open star cluster of the Pleiades at the Magdalenien era (ca. 15.300 BC)?" in *Actas del IV Congreso de la SEAC "Astronomía en la Cultura"*, Universidad de Salamanca (1997): 217 – 225

fully understand the intention of the Upper Paleolithic art and myths. But it is impossible to deny the fact of their strong connection with cosmic ideas: from counting and repeating celestial cycles to the way of perceiving the world and oneself in it.

Our relationships with outer space today are to a large extent based on a capitalist and anthropocentric approach. Tracking back to all known history of humankind can change the parasitism on the terrestrial and celestial resources by questioning the contemporary approach and building new relations not only with outer space but also on Earth.

This work is intended to reveal the close relationship between humanity and cosmic ideas and to show how these ideas were based on utopian futures. I will do this by providing a number of illustrative examples. In what follows I will first discuss the impact of Newtonian celestial mechanics on the formation of democracy in Enlightenment. Thereafter I will move to the contemporary expansion of the capitalist-colonial discourse into outer space, and in conclusion I will briefly touch on alternative approaches to cosmic ideas.

2 The impact of astronomical ideas on politics in Enlightenment

In 1687 Isaac Newton published the first edition of *Philosophiæ Naturalis Principia Mathematica (Mathematical Principles of Natural Philosophy)* or *Principia,* where he formulated the law of universal gravitation and three laws of motion, which became the basis of classical mechanics. The third law of motion states:

> To every action there is always opposed an equal reaction: or, the mutual actions of two bodies upon each other are always equal, and directed to contrary parts.[11]

Further in the third book of Principia Newton applies this axiom to the entire Solar System, which will lead later to one of the most important influences on European

[11] Newton, Isaac. *Mathematical Principles of Natural Philosophy and System of the World*. Edited by Florian Cajoli. Berkeley: University of California, 1973, 13

culture - the acceptance that the whole universe and all bodies that inhabit it complies with one universal rule. Its cosmological formula wasn't found by accident or as a result of experimentations; Newton analysed and synthesized Kepler's observation of celestial phenomena and Galileo's doctrine of motion. But significantly, Newton had intellectually transformed complex structures and reduced it to the fundamental form of natural law.[12]

Newtonian discovery became a pervasive form of philosophical and political discourse of the Enlightenment. According to Arthur O. Lovejoy, seventeenth and eighteen centuries philosophers

> when discoursing on the divine government of the world, often declared it to be axiomatic that the Creator always accomplishes his ends by the simplest and most direct means, they also tended to assume that he is frequently under the necessity of employing what may be called the method of counterpoise-accomplishing desirable results by balancing harmful things against one another.[13]

This *"counterpoise"* intellectual method is based on Newton's celestial mechanics: centrifugal force, which act on a body moving in a circular path and is directed away from the centre around which the body is moving[14] and centripetal force, which acts on a body moving in a circular path and is directed towards the centre around which the body is moving[15], are counterbalancing each other and cause celestial bodies to spin in their orbits.[16] If the entire universe is subject to a set of natural laws, then the same laws must be applied to human society, according to the theory of courpoise and required balance between forces.[17]

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[12] Cassirer, Ernst. *The Philosophy of the Enlightenment*. NJ:Princeton University Press, 1951, 8-12
[13] Lovejoy, Arthur O. *Reflection on Human Nature*. Baltimore: The John Hopkins Press, 1961, 38-39
[14] https://www.lexico.com/definition/centrifugal_force
[15] https://www.lexico.com/definition/centripetal_force
[16] Lovejoy, Arthur O. *Reflection on Human Nature*. Baltimore: The John Hopkins Press, 1961, 38-39
[17] Strine, Richard. "Political Newtonianism: The Cosmic Model of Politics in Europe and America". *The William and Mary Quarterly*, Vol. 52, No. 4 (1995): 583 – 608, 586

By applying Newtonian laws to political systems and social structures monarchy as political power should be deconstructed or replaced according to celestial law. The monarch "can move no longer in another orbit from his people, and, like some superior planet, attract, repel, influence, and direct their motions by his own. He and they are parts of the same system, intimately joined and co-operating together, acting and acted upon."[18]

Richard Strine describes how late seventeenth and mid-eighteenth century thinkers interpreted the Newtonian paradigm in different ways. John Locke, who was seen as one of the founders of liberal political thought, doubted that humanity can comprehend the nature of physical things. This is the reason why cosmic patterns can't be applied for reforming society. Leibniz, who proposed that the cosmic process is reflecting everywhere, even at the microcosmic level of existence, so it already should be latent in society and a better tactic for socio-policy is progressive self-development of natural forces. Montesquieu, who saw society as a product of human responsibility, proposed to directly establish cosmic ideas into state structure. Besides European versions of Newtonian socio-political theory no less significant were Nord American thoughts which lead towards revolutionary discourse in the late eighteenth century.[19]

The same ambivalence in commitment to Newtonian science could be seen in America's founding generation. Ideas about independence of America from the British Empire and formation of Constitution with socio-political equality coexisted with slavery, neglection of women rights and dismission of Native American's of rights of their land.[20]

Thomas Paine, born in a low class English family, is an eighteen-century political writer and activist, who demonstrated one of the more passionate approaches to Newtonian ideas and played a peculiar role in early stages of American politics. According to politician historian Jack Fruchtman, Paine defies easy categorisation because of a mass of contradictions: a believing and nonbeliving Quaker, who later

[18] Strine, Richard. "Political Newtonianism: The Cosmic Model of Politics in Europe and America". *The William and Mary Quarterly*, Vol. 52, No. 4 (1995): 583 – 608, 586
[19] Ibid., 589-594
[20] Fruchtman, Jack Jr. *The Political Philosophy of Thomas Paine*. Baltimore: The John Hopkins University Press, 2009, 19

became a deist, a liberal and a radical in politics, he is an economic conservative. But his influence on revolutionary discourse in America, England and France stays undoubted.[21]

The application of Newtonian laws to socio-political theory faced the fact that it is not enough to plead for equality in society and state structure, there was a need for specific formulas for achieving it. A way to define these formulas was based on analysing the balance of the political forces, understanding which forces imbalanced the whole system and applying a counterpoise method to create a balance.[22] In his first work *Common Sense*, which was published in 1776, Thomas Paine establishes this "imbalance" to monarchy and calls for global revolution, which firstly he addressed to America. Focusing on North America he sees problems of the continent in British government and claims for independence:

> One man so greatly above the rest cannot be justified on the equal rights of nature, so neither can it be defended on the authority of scripture.[23]
>
> The authority of Great Britain over this continent, is a form of government, which sooner or later must have an end.[24]
>
> It is repugnant to reason, to the universal order of things, to all examples from the former ages, to suppose that this continent can longer remain subject to any external power. As to government matters, it is not in the powers of Britain to do this continent justice: The business of it will soon be too weighty, and intricate, to be managed with any tolerable degree of convenience, by a power, so distant from us, and so very ignorant of us; for if they cannot conquer us, they cannot govern us. [25]

[21] Ibid., 19-20
[22] Strine, Richard. "Political Newtonianism: The Cosmic Model of Politics in Europe and America". *The William and Mary Quarterly*, Vol. 52, No. 4 (1995): 583 – 608, 594
[23] Paine, Thomas. *Common Sense*. Edited by Moncure Daniel Conway. New York: G.P. Putnam's Sons, 1894, 9
[24] Ibid., 21
[25] Ibid., 22-23

> I draw my idea of the form of government from a principle in nature which no art can overturn, viz. that the more simple any thing is, the less liable it is to be disordered, and the easier repaired when disordered.[26]

According to Jack Fruchtman, in contrast to Locke, Paine perceives a diversity of human powers as a natural mechanics of human which is related to the physical laws. His theory makes society more consistent than government by applying those diversities to a method of creating first of all a self-regulating society before the state regulates. Denying the concept of aristocratic sovereignty, Paine sees a democratic republic, the majority-rule, as a natural source of government where regardless of social class people can take an active part in this process. Despite Paine's influence on the Founding Fathers, his ideas were too radical for them: autonomy and self-regulation brought Congress to the fear of losing control over territory and population of the republic. An early constitution started with his application of astronomical laws to the society structure and system of government, but shifted to Lockian ideas, which were considered as more secure.[27]

An application of Newtonian political imagery still was present at the end of eighteen century. Some argue that ideas of celestial balance were crucial for an ideal government: the Newtonian paradigm was a field for political agreements and disagreements, showed new hopes and old fears and laid the foundation for democracy, which is still the main form of government.[28]

3 Contemporary cosmic narratives

In the era of the cosmic race, Hanna Arendt wrote an article where a question of consequences of erasure of borderlines between inner and outer space is raised. She

[26] Ibid., 6
[27] Fruchtman, Jack Jr. *The Political Philosophy of Thomas Paine*. Baltimore: The John Hopkins University Press, 2009
[28] Strine, Richard. "Political Newtonianism: The Cosmic Model of Politics in Europe and America". *The William and Mary Quarterly*, Vol. 52, No. 4 (1995): 583 – 608

warned against human space exploration and especially against physical dislocation of human bodies.

> If we look down from this point upon the various activities of men[...], then these activities will indeed appear to ourselves as no more than "overt behaviour", which we can study with the same methods we use to study the behavior of rats[...] All our pride in what we can do will disappear into some kind of mutation of the human race; the whole of technology, seen from this point. In fact [...] is a large-scale biological process. Under these circumstances, speech and everyday language would indeed be no longer a meaningful utterance that transcends behavior [...] and it would much better be replaced by the extreme and in itself meaningless formalism of mathematical signs.[29]

Arend's concerns of being in the cosmos express terrestrial alienation: being in space can undermine the meaning of being human and disrupt reference to existence on Earth. During the last sixty years, from the moment of the first man in space until today, only 571 have been in space. It could be said that space exploration is marked more by robots than by humans.[30] It seems that Arend's concerns did not materialize. But it does not mean that cosmic ideas disappeared from the horizon of relevant agenda for humanity. They just changed in the quiet opposite direction of terrestrial alienation.

In March 2019, USA's vice-president under the Trump administration Mike Pence, in his speech at Space & Rocket Centre in Huntsville, claimed

> to return American astronauts to the moon within the next five years [...] To be clear: the first woman and the next man on the moon will both be American astronauts, launched by American rockets from American soil.[31]

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[29] Arendt, Hanna. "On the conquest of space" in *Encyclopaedia Britannica*, 1963 edition of *The Great Idea Today,* 13-14

[30] The Economist: "The Next 50 Years in Space: A New Space Exploration is Beginning". Edition July 20th 2019

[31] Foust, Jeff. "Pence Calls for Human Return to the Moon by 2024" in *SpaceNews*. Published March 26, 2019

The previous deadline shifted from 2028 toward 2024. In May 2019 NASA's administrator Jim Bridenstine made an announcement about a new lunar mission called *Artemis*, a twin sister of Apollo, Greek goddess of the Moon. The agency's approach to be present on the Moon by 2024 requires three launches of the new Space Launch System (SLS) with Orion spacecraft and presence of a minimalist version of the Gateway on the Lunar orbit. [32] In October 2020 the governments of the United States, Australia, Canada, Japan, Luxembourg, Italy, the United Kingdom, and the United Arab Emirates signed up to the Artemis Accords.[33] Later in 2020 Ukraine joined this group. The international agreement states principles for cooperation in the civil exploration and use of the Moon, Mars, comments and asteroids for peaceful purposes. Signatories of these Accords will

> enhance the governance of civil exploration, [...] and promote the sustainable and beneficial use of outer space for all humankind. [...] Recognize that the development of interoperable and common exploration infrastructure and standards, including but not limited to fuel storage and delivery systems, landing structures, communications systems, and power systems, will enhance space-based exploration, scientific discovery, and commercial utilization. [34]

Among all, NASA is opening the International Space Station (ISS) to commercial opportunities, which lead to the criticism of the mission from other countries.[35] The Artemis mission is not alone: China National Space Administration (CHSA) plans to land the first Chinese person to the Moon surface by 2035. Other agencies, such as European, Russian, Japanese and Indian intended to send robot probes to the Moon.[36]

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[32] Manske, Court. "To the Moon in Five Years: Understanding NASA's Artemis Program" in *Aerospace Security*. Published July 13, 2019
[33] NASA. "The Artemis Accords: Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes". Signed up on October 13, 2020
[34] Ibid., 1-3
[35] Foust, Jeff. "NASA Tries to Commercialize the ISS, again" in The Space Review. Published June 10, 2019
[36] The Economist: "Lunar Exploration: Is It Time to Go Back to the Moon?" Edition July 20th 2019.

The interest in low Earth orbit (LEO), Moon and Mars exploration affected not only government players. Private sector and the presence of billionaires in rocket science started an era of "NewSpace".[37] Founded by Elon Musk in 2002, the Space Exploration Technologies Corporation (SpaceX) became a first game changer in rocket science. The difference in price of rockets between the state aerospace manufacturer United Launch Alliance (ULA) and SpaceX stands out drastically ($400 million per launch, versus about $100 million). Decrease of cost production with a combination of reusability of rockets led NASA to collaborate with SpaceX and take a part in different missions, such as Artemis.[38] Together with this SpaceX already has a contract for lunar tourism. Yusaku Maezawa, a Japanese billionaire entrepreneur and art collector, wants to take a group of eight civilians with him for a project he calls *#dearMoon*. This is a trip around the Moon passing behind the far side which is planned for 2023.[39] The Musk and SpaceX approach to outer space is based on a *"multiplanetary future"* and ideas of Mars colonisation.[40] Elon Musk, as cited by Tim Fernholz, answered on a question about a presence on humanity on other planets:

> Eventually, history suggests, there will be some doomsday event. The alternative is to become a spacefaring civilization and a multiplanet species.[41]

Jeff Bezos and his Blue Origin aerospace manufacturer, founded in 2000, are the strongest competitors of the SpaceX program. The official mission of Blue Origin is based on preservation of Earth for the future generations through tapping of space's unlimited resources and energy.[42] The first goal is to establish a tourist flow into suborbital space. In this field the company already has a competitor in the face of Virgin Galactic, founded by british billionaire Richard Branson, with a goal of providing

[37] Valentine, David. "Exit Strategy: Profit, Cosmology, and the Future of Humans in Space". *Anthropological Quarterly*, Vol. 85, No. 4 (2012): 1045 – 1067
[38] Fernholz, Tim. *Rocket Billionaires: Elon Musk, Jeff Bezos, and the New Space Race*. New York: Houghton Mifflin Harcourt, 2018, 4-30
[39] https://dearmoon.earth/
[40] https://www.spacex.com/human-spaceflight/
[41] Fernholz, Tim. *Rocket Billionaires: Elon Musk, Jeff Bezos, and the New Space Race*. New York: Houghton Mifflin Harcourt, 2018, 44
[42] https://www.blueorigin.com/our-mission

regular and safe recreational space tourism. But Blue Origin goes further with a long term project that will be building colonies on the Earth orbit for the permanent living of humanity in outer space. Bezos' ambition doesn't stop at LEO. A mission of his Blue Moon project is to build a lunar economy. A lunar landing system for cargo and crew will make possible the presence of the first private company on an astronomical body.[43]

The rhetoric of NewSpace companies builds on a vision of the future and capitalism: today's commercial activity in outer space will radically and positively transform the future society by establishing human settlements in the solar system (and beyond) and will prevent the extinction of humanity later. A collapsing environment and limits of Earth's resources didn't change capitalism, rather the opposite. Outer space became attractive for investors as a new frontier for continuing economic growth and extraction of energy, fuel, minerals, land. In 2010 at Space Investment Summit Amaresh Kollipara, a NewSpace entrepreneur, said:

> Space is not a destination [...] Space accelerates and expands business verticals by providing new disruptive ways of doing business.[44]

Space became a place of economical profit. Musk tells:

> The reason I'm doing SpaceX is not because I think the rocket business is the easiest place to make money, it's an extraordinarily difficult place to make money, and would be pretty low on the list of things you'd want to try if maximizing your wealth was your goal. But [...] I really want us to become a true space-faring civilization and ultimately be on a path to becoming a multi-planetary civilization and going out there and exploring the stars and making true the things that one sees in sci-fi movies and reads in books about the future. That's my goal for SpaceX. Other companies have their corporate goals of profitability and that sort of thing which is fine, that's how the economy works. I don't make any value

[43] Fernholz, Tim. *Rocket Billionaires: Elon Musk, Jeff Bezos, and the New Space Race*. New York: Houghton Mifflin Harcourt, 2018

[44] Valentine, David. "Exit Strategy: Profit, Cosmology, and the Future of Humans in Space". *Anthropological Quarterly*, Vol. 85, No. 4 (2012), 1059

> judgments about that. But for SpaceX it is really about furthering the cause of space. We must bring in more money than we spend otherwise we'll go out of business, but maximizing profitability is absolutely not something I care about. [...] So it's like, you should bear in mind, if you're investing this is what I'm going to do, so don't complain later that I'm not maximizing profitability.[45]

Rosa Luxemburg theorized that "capitalism works by folding its outside as its resource".[46] Based on it Richard Seymour claims that "outer space really is the final frontier for capitalism".[47] The reestablishment of capitalism in space is presented in public as a being for the good of humankind: cheap solar power, the presence of helium-3 on the Moon and different minerals, such as platinum, silicon, nickel and even iced water that can be gathered on asteroids. David Valentine argues that the public needs take the approach of NewSpacers seriously and build a dialogue about consequences of such world-making:

> If we don't pay attention to the explicit Utopian human futures of people who are powerful enough to at least set them in motion, are we not preventing ourselves from becoming involved in one of the emerging debates about what a human future should look like. [48]

> NewSpace is unique not only in that it encompasses diverse industry sectors,but more importantly because it envisions itself as shaping the total future of the human species and of life on Earth itself; in this way, it is cosmological.[49]

In the late 80s until the early 2000s a few grassroots organizations, such as the Mars Society and Mars Underground, started to plan missions to Mars without

[45] Ibid., 1062
[46] Parikka, Jussi. *A Geology of Media*. Minneapolis: University of Minnesota Press, 2015, 128
[47] Ibid., 128
[48] Valentine, David. "Exit Strategy: Profit, Cosmology, and the Future of Humans in Space". *Anthropological Quarterly*, Vol. 85, No. 4 (2012), 1066
[49] Ibid., 1065

articulating a reason for it.[50] An evangelist of those planning, aerospace engineer Robert Zubrin, formulated a justification for Mars mission in 1994:

> The creation of a new frontier thus presents itself as America's and humanity's greatest social need. . . . Without a frontier to grow in, not only American society, but the entire global civilization based upon Western enlightenment values of humanism, reason, science and progress will die. I believe that humanity's new frontier can only be on Mars.[51]

By 2019 the colonialist rhetoric of Mr. Zubrin got even stronger. In one chapter where he uses a quote of Thomas Paine "We hold it in our power to begin the world anew" he proposed that "Mars is the New World".[52]

> Life in the initial Mars settlements will be harder than life on Earth for most people, but life in the first North American colonies was much harder than life in Europe as well. People will go to Mars for many of the same reasons they went to colonial America: because they want to make a mark, or to make a new start, or because they are members of groups who are persecuted on Earth, or because they are members of groups who want to create a society according to their own principles. Many kinds of people will go, with many kinds of skills, but all who go will be people willing to take a chance to do something important with their lives. Out of such people are great projects made and great causes won. Aided by ever-advancing technology, such people can transform a planet and bring a dead world to life.[53]

The anthropologist of science and technology Lisa Messeri claims that outer space should be perceived as a social place. It is a crucial site for "examining practices of

[50] Messeri, Lisa. *Placing Outer Space: an Earthly Ethnography of Other Worlds*. Durham: Duke University Press, 2016, 49-50
[51] Ibid., 49
[52] Zubrin, Robert. *The Case for Space: How the Revolution in Spaceflight Opens Up a Future of Limitless Possibility*. New York: Prometheus Books, 2019, 75
[53] Ibid., 86

future imagining in social terms, and for anthropological engagement with these practices".[54]

> Outer space is social, and studying it as such will help articulate the changing dynamics between our world and others. Drawing inspiration from planetary scientists, we can reconceptualize the universe not as a void but as densely inhabited by planets and other cosmic objects that tell us about Earth.[55]

The current rhetoric of Nasa and NewSpacers reproduces inherent hierarchies and exclusions that spin around place-centric projects of exploration. Rather than *"settlement"* scientists are rendering their work as *"exploration"*: humans have "explored" LEO and will "explore" Moon, robots are "exploring" Mars, exoplanet astronomers dream of "exploring" planets outside of the Solar System. The imperial context makes the rhetoric of exploration powerful and creates hierarchies and exclusions.[56]

Messeri argues that we are already giving a form of planetary imagination to Mars, Moon and other planets outside the Solar System, but the way we are doing it is just repeating the same patterns we developed during the history of humankind. She defines place-making techniques for space exploration: narrating, mapping, visualizing, and inhabiting. Narrating builds a rich story that connects Earth with another world. For example, the Mars Desert Research Station (MDRS) in the Utah desert is outfitted as its designers imagined an early settlement on Mars might be: locals wear simulated space suits, and simulate the bodily experience of studying Mars in an unsettled landscape. One participant recounted: "This beautiful landscape is a glimpse of what a real Martian landscape might look like. It felt more than just a setting for a Mars simulation. A more accurate feeling: this IS Mars!"[57]

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[54] Messeri, Lisa. *Placing Outer Space: an Earthly Ethnography of Other Worlds*. Durham: Duke University Press, 2016, 16
[55] Ibid., 17
[56] Ibid., 20-24
[57] Ibid., 26

The technique of mapping positioned Mars as a mobile site of exploration and is shared beyond the scientific community. The mapping presented as the digital globes of Mars (3D map similar to Google Earth) was created by a small group at NASA Ames called Mapmakers. Their goal is to make NASA's geospatial data universally and easily accessible via freely available tools like Google Earth and Microsoft WorldWide Telescope (WWT). Messeri argues that the primary goal of Mars mapping is "to establish Mars as inviting to human explorers".[58] To achieve this goal Mapmaker presents Mars as democratic (open source accessible to all), as an experience (in a form of 3D map) and dynamic place (possibility for scientific study). But presented as a new, Martian planetary imagination, is, in fact, nothing more than reworking of traditional mapping techniques that have been used to mapping the Earth. "Maps, even scientific maps, are not neutral representations but are infused with the norms of the community that creates them."[59] For example, when making Mars for Google, engineers used the same map projection for Mars that they used for Earth: Mercator projections, which inflates the size of objects away from the equator. That means that Martian poles on this 3D map will be distorted as terrestrial ones. In the case of Mars, the precise size of the poles is extremely important for scientific purposes, because it contains the only known deposit of water ice on the planet. Behind the "democratisation" of Mars and accessibility of data for everyone stays not only intention to educate and inspire, but also stirring up public interest in the Martian mission. The rhetoric and the tools of exploration developed by Mapmakers are accessible for an educated, English-speaking, digitally connected user. Messeri concludes that Mars "made an object of exploration, the map is in service of NASA's goal of eventually sending humans further into space"[60], ensures funding for NASA and jobs for those who work with Mars data.

The technique of visualising Messeri describes with the example of exoplanet astronomers. She raises a problematic interpretation of data in an exoplanet field: they are creating a "visual language" and "learning newcomers how to see data as worlds".[61]

[58] Ibid., 74
[59] Ibid., 73
[60] Ibid., 107
[61] Ibid., 145

> The ultimate goal is for a visualization to be seen as a planet that evokes a world: a "hot Jupiter," an "ocean planet," a "super Earth." Language and visualizations work together to suggest not only that a planet exists but, more important, what the experience of visiting this planet would be like. All the while an imagination fuels this understanding of the planetary whole as a world.[62]

Exoplanet astronomers build professional identities by making their study look less ephemeral and more as recognizable worlds. Scientists are looking for a world that doesn't seem exotic but familiar through developing new visual and linguistic language to facilitate world-making. This discourse coexists with the technique of inhabitation. In a Bush-era space policy a narrative of habitable planets came to be a synonym of the way which humankind poses in the universe.[63] The planetary scientist Jonathan Lunine wrote in 2004:

> The scientist walks their kids away from the campfire out into an open field and points to a certain set of constellations in the sky, and she points to two stars in particular and says, "Do you see these two stars? Each of them we know has an Earth orbiting around it, much like our own Earth orbits our sun. We know that there is air and there are clouds around that particular planet, the one around that star, and so there are plans to look more closely at it to see if there are signs of life." And then she concludes, "Maybe some day when your children's children's children are alive, they will go to that distant world to touch its soil and meet whoever or whatever is there." [64]

This image of the next generations pointing out on the Earth-like planet is the imagination of the existence of humankind in many places in the universe.

[62] Ibid., 145
[63] Ibid., 149-187
[64] Ibid., 151

Messeri concerns the rhetoric of "obviousness" behind the space exploration, planetary science's search for worlds and life like our own. NewSpacers and some scientists render Mars as a new "frontier" for humanity's future and generation of new ideas. The current study of other planets looking for the answer to "our place in the universe" probably will come in the form of a detection of a habitable, Earth-like planet: knowing of existence such planets will finally allow us to know Earth.[65]

> Ideas of what it means to be on Earth shape studies of other planets, and studying the habitability of other worlds refines how we define life on Earth.[66]

In contemporary cosmology nothing appears as an isolated body. Astronomers, planetary scientists constantly erect interconnections and comparisons between Earth and other planets. But the narrative of space exploration, this projection of Earth and way of living there on other planets stays unquestioned. A lack of critical discourse around the capitalist - colonialist approach to outer space could be dangerous for the formation of utopias of humanity.

4 Conclusion

Humankind has a long history of knowledge that gleaned from space. We can trace the patterns that people saw in the starry sky all the way back to the Paleolithic era. Cosmic ideas shaped each civilisation, all stages of development of humanity and are still deeply integrated in our society. Jo Merchant gives numerous examples in her book how cosmic narratives built around the Sun, Moon and stars played a central role for the birth of Christianity, how the development of science served as an important milestone in the application of astronomical laws to politics and society and founded first principles of democracy and human rights. Along with these same ideas brought Europe to the exploration of new territories, colonization and domination all over the planet. The current politics of National Space Agencies and NewSpacers are based on

[65] Ibid., 195
[66] Ibid., 196

expansion of the capitalist-colonialist approach to cosmic utopias. Contemporary realities of climate change and the socio-economic consequences of it require a fundamental rethinking of our relation to the Planet and to outer space.[67]

Historically Earth was imagined as coherent figures such as the Globe, the Terrestrial or the Planetary. The first one - the Globe - renders Earth as a perfect sphere with segmentation of its surfaces. Narratives of the Globe build on some misconception about the planet which lead European countries to colonial expansion and understanding the planet as a whole only through Western conceptions. The figure of the Terrestrial, in opposition to the Globe, is a critical response to the globalisation approach of imagining the planet. This concept imagines Earth as a superorganism where human and non-human agents build a network of interdependencies, relations and obligations to create a sustainable, liveable world. The figure of the Planetary is juxtaposed with both the Globe and the Terrestrial, and rendering the planet as a geophysical, impersonal process.[68]

Developed by Gayatri Spivak, the term *Planetarity* comes from a post-colonial, geopolitical discourse and pursuit of increasing and involuntary human migration. Spivak is looking for a way of justification of care as a basic human right and responsibility. She claims that it could be achieved by imagining Earth as a Planetary: the whole Planet becomes a habitation, there is no local place one comes from, there are only points of departures and arrivals. In this view humans are just custodians of the planet with a purpose of care towards others, no matter if it will be human or non-human or even geological agents.[69]

I think that in contemporary reality we need to go even further and imagine planet and outer space from the perspective of the *world-without-us*[70], which is a negotiation of perceiving the whole universe as a world only for us, as the most intelligent form of life, and shifting towards the planet as an impersonal agent without human presence. This imagination does not refuse the fact of life, but recognizes a separation between organic and non-organic and that the existence of Earth and other

[67] Marchant, Jo. *The Human Cosmos: A Secret History of the Stars*. Edinburgh: Canongate Books Ltd, 2020
[68] Likavčan, Lukáš. *Introduction to Comparative Planetology*. E-book: Strelka Press, 2019
[69] Spivak, Gayatri Chakravorty. *Death of a Discipline*. New York: Columbia University Press, 2003
[70] Thacker, Eugene. *In the Dust of This Planet: Horror of Philosophy*. Winchester: Zero Books, 2011, 12

planets such as Mars emerges from inorganic forms first of all.[71] This understanding can lead us not only to inventing care for others as the main goal of existence, but also to rethink everything we know about the natural processes occurring in the universe, as well as to understanding ourselves.

Some philosophers (Georges Bataille, John Berger, etc) examine the Lascaux paintings as a point of origin on human subjectivity. Analysis of paint used in Lascaux showed that it was made from tempered mineralization of animal's bones firing a binder of water, blood, urine or grease. The created images literally depend on geological agents: how minerals show and hold paint, and how it lasts until the present. The combination of nonhuman, inhuman and geological agents gives the survival of those pictures. So in the formation of human subjectivity went through incorporation of nonhuman and inhuman agents. The origin of humans is already geological.[72]

> We shall be inhuman — as the loftiest conquest of man. Being is being beyond human. Being man does not work, being man has been a constraint. The unknown awaits us, but I feel that this unknown is a totalization and will be the true humanization for which we longed. Am I speaking of death? no, of life. It is not a state of happiness, it is a state of contact.[73]

[71] Thacker, Eugene. *In the Dust of This Planet: Horror of Philosophy*. Winchester: Zero Books, 2011, 11-14
[72] Yusoff, Katrin. "Geologic Subjects: Nonhuman Origins, Geomorphic Aesthetics and the Art of Becoming Inhuman". *Cultural Geographies*, Vol. 22, No. 3 (2014): 383 – 407
[73] Lispector, Clarice. *The Passion According to G.H*. Edited by Benjamin Moser. E-book: A New Directions Book, 2014, 95

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