

FROM DISCOURSE TO REALITY: A CRITIQUE OF THE
SUSTAINABILITY DISCOURSE FOR ACTIVITIES IN EARTH ORBITS

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Abstract

Political-military-economic elites have exerted hegemonic abuse of power towards the peoples and ecosystem of Earth through production and propagation of misleading and manipulative discourses on the fundamentals of space sustainability. The elites have utilized their discursive powers to create knowledge, attitudes, and ideologies among the general public in favour of geopolitical, military, and capitalist domination, commodification, and exploitation of Earth orbits for their own benefit. Manipulative discourses on space sustainability have enabled the elites to exercise control over the minds and actions of the public while suppressing different forms of resistance and dissidence. A sociocognitive critical discourse analysis of major discourses on space sustainability demonstrates numerous ways through which the elites have led a campaign of mind control to justify their expansionist and imperialist activities in outer space, particularly in Earth orbits. The results of the analysis demonstrate the urgency of challenging and shifting the stream of manipulative discourses on space sustainability, proposing awareness raising, counter-discourse and civil movements as the most effective approaches.

Dedication

To Earth

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Chapter One

1.1 Introduction

A sense of awe and wonder has always accompanied humanity's imaginative and speculative attempts to envision outer space. These emotions towards outer space have been the drive for numerous discourses throughout history; from the fear and admiration of our hunter-gatherer ancestors to the logical curiosity of the astronomers of antiquity and the feeling of self-entitlement of contemporary humans for using its resources. The awe and wonder are mainly caused by the fact that outer space for the most part has not been accessible for most individuals and only very recently have the selected few been able to travel to space (highly trained astronauts or wealthy space tourists). While myths and stories about outer space have existed for a long time, it was with the development of aerospace technology and the advent of media transmission, the Internet, and social media in recent decades that more factual and less fantastical knowledge about outer space became accessible for a larger audience beyond astronomers, academia, and governments. However, the quantity and quality of that knowledge is constantly controlled by the political, military, and economic elites who are in control of the robotic missions into deep space, satellites and space stations in Earth orbits and relevant public discourses which reinforce that knowledge.

When critical and relevant knowledge is either absent or partial, alternative knowledge is not openly obtainable and recipients do not have access to the physical realities of outer space, it becomes easy to not only shape specific knowledge – often misleading – but also prevent resistance. In the absence of access to the said environment for first-hand observation, what is introduced as a representation via different discourses is enough to affect the minds of the recipients; and, after all, if one can have control over the minds, one can have control over the actions. Heightened emotions of awe or fear make individuals more vulnerable to influences

exerted on them through discourses reproduced by the elite, since such discourses would be received as psychologically and socially relevant.

These relationships have become more complex and multilayered in the past decade due to addition of the private sector to the equation. Whereas up to the 20th century, the production and dissemination of major outer space discourses were mostly in the hands of states and intergovernmental organizations, today a substantial portion of those discourses are created and promoted by private sector actors, some of whom enjoy a great amount of popularity due to their immense capital, visible presence on social media and constant outreach to the public.

In tandem with this increase in the activities and actors in the outer space industry, several issues have developed in Earth orbits, such as the alarming amount of space debris, detrimental environmental impacts, and militarization and weaponization of Earth orbits. Such developments have led to discussions about ‘space sustainability’ -- especially in Earth orbits which are the most used and endangered outer space environment as the result of human activities. While several proposals have been put forward for making activities in outer space ‘sustainable’, they have been built upon an existing definition of ‘space sustainability’ which has been accepted as a given and has acted as the foundation for all relevant guidelines. Moreover, a new spacepower has emerged in the last two decades: the private space sector and space billionaires who have been promoting their own versions of ‘sustainability’ in order to plan and promote their own agenda.

This research argues that the fundamentals of ‘space sustainability’ in official international sources or as articulated by space billionaires is the product of discursive powerplay among the political, military, and economic elites. Drawing on a sociocognitive approach to Critical Discourse Studies, this research will demonstrate the ways in which the elites have produced, reinforced, and propagated their manipulative discourses to create and retain a definition of ‘space sustainability’

which has become widely accepted and normalized; and has therefore enabled them to exert continuous hegemonic abuse of power towards the peoples and ecosystem of Earth. This abuse of power by the elites has taken place through militarizing and weaponizing of Earth orbits; exploiting Earth orbits in favour of capitalist and dominating purposes without consideration for detrimental environmental and geopolitical effects on the whole planet; disregarding the rights of nonhumans and the whole of biosphere, propagating a romantic ideology in support of frontierism and neoliberal expansionism for the benefit of selected groups; and leading a campaign of fear by spreading survivalist and futuristic discourses to justify their egotistical and imperialist activities commencing in Earth orbits and spreading to other celestial bodies.

In the current chapter, this research illustrates its thesis by providing examples of discourses on ‘outer space’ from various historical periods and in different forms such as painting, oral story, artifact, text, and speech. It then introduces the term ‘space sustainability’ and shows the importance of the analysis of space sustainability discourses by highlighting their relevance to the current and future conditions of Earth orbits. Finally, an overview of the theoretical framework and methodology which guide this thesis will be provided.

The second chapter introduces historical chain of events which led to the formation of the Outer Space Treaty (1967) that has been serving as the foundation for the fundamental concepts employed in defining ‘space sustainability’. The chapter then analyses different components of that definition as offered in the *Guidelines for the Long-Term Sustainability (LTS) of Outer Space Activities* of the UN Committee on the Peaceful Uses of Outer Space (COPUOS) examining its organizational, geopolitical, and social dimensions. This will be followed by an analysis of the rhetorical and discursive strategies employed by the elites to persuasively present their doctored views and definitions of ‘outer space activities’ and ‘space sustainability’ to global peoples to

manipulate public attitudes and ideologies and to disguise the ugly realities of their activities in outer space.

Recognizing the importance of the role of the private space sector and especially space billionaires in the formation of a new spacepower led by discourses, capital, and influence, the third chapter provides an analysis of the rise of the private space sector and its discursive powers. It then looks at the sustainability discourses of two of the main private actors in outer space industry exposing how they have been manipulating the public through their survivalist and futuristic versions of sustainability in order to gain public support for their expansionist and capitalist attitudes.

The last chapter explores ways to challenge and shift the current discourses into one which speaks not only for the dominated and the manipulated humans but for the whole Earth. Generations of space enthusiasts have been manipulated by the elites into believing in a romantic view of outer space exploration. However, it is time for this veil to be lifted and for the Earthlings to face the reality of what goes on in outer space. The most ideal solution would be the updating of the fundamentals of the binding international mechanism into a more inclusive, ethical, and responsible one. However, it has been observed repeatedly that taking into consideration the overly complex geopolitical international scene, devising new binding mechanisms is a slow process and as effective as soft law is, it lacks enforcement power. The urgency of the current situation calls for other tactics to hasten the process of bringing the necessary changes into effect. This final chapter recommends awareness raising -- leading to civil and environmental movements as effective catalysts for hastening the process of amending the fundamentals of the international regulating mechanisms for outer space activities.

1.2 ‘Outer space’ discourse in early history

It is widely believed that early discourses about outer space date back to ancient history, beginning with the earliest recorded history about 3000 BC, until late antiquity of 500 AD. However, our enchantment with the skies is much older and multifaceted. It is as old as the relatively brief history of our civilization on Earth. Our hunter-gatherer ancestors were not only watching the heavens, but were also dreaming, reminiscing, and wondering about them. A recent study at the University of Edinburgh (Sweatman and Coombs, 2019) has found that several cave paintings in Europe, dating back to almost 40,000 years ago, were not merely depiction of animals and our ancestors’ surroundings but were demonstrations of their particular attention to celestial phenomena and efforts to understand and define such phenomena and subsequently to describe, explain and convey such understanding, long before writing or modern languages existed. For example, Sweatman and Coombs (2019) show that Lascaux Shaft Scene in France, dated to around 17,000 to 13,000 BCE, and featuring a dying man and animal symbols representing star constellations in the sky, may be a remembrance of a comet strike which happened around 15,200 BC. It is worth mentioning that an alternative interpretation for the Lascaux Shaft Scene offers a shamanistic explanation. Campbell (1960) believed that the man with a bird mask, the bison and the man’s wand portrayed a scene of shamanistic trance. Overall, interpretations of this ancient discourse revolve around the scene being a witness to an event or a situation or “an unwittingly proxy in a grand ideological tradition.” (Molyneaux, 2022)



Figure 1. Lascaux Shaft Scene in France. Picture credit: Sweatman and Coombs (2019)

Our hunter-gatherer ancestors used the stars as guides for recording dates; and while they may have considered the skies as mysteries, they also, through their paintings such as the Lascaux Shaft Scene informed the future generations of the calamities that befell them when those stars fell from the skies (Sweatman and Coombs, 2019). Awareness of the celestial presented itself in various forms and set the foundation for the creation of several myths, legends, spiritual and religious thoughts and establishments, ideological structures, political convictions, scientific discoveries, and technological inventions.

Thousands of years later, for the people of ancient Mesopotamia, the celestial was interwoven with awe and fear as they recounted the *Epic of Gilgamesh* in which heavenly gods sent the great flood from the skies to destroy humans who were overpopulated and made too much noise; an epic

rooted in oral storytelling, which was recorded on 18th-century BCE clay tablets in ancient Akkadian cuneiform.¹



Figure 2. Original Akkadian Tablet XI (the "Deluge Tablet") of the Epic of Gilgamesh (Credit: The British Museum)²

Not every depiction of the heavens was cautionary. As civilizations grew more aware of their natural surroundings, they started to chart the skies in an attempt to not only satisfy a sense of wonder but also to depict the heavens vividly in order to understand them. The Nebra sky disc, dated to 1600 BCE Nebra in present day Germany, is one of the earliest of such attempts.

¹ For a short overview of the Epic of Gilgamesh see, "Gilgamesh" by Joshua J. Mark published on World History Encyclopedia website on March 29, 2018. <https://www.worldhistory.org/gilgamesh/>
For an analysis of the history and story of Epic of Gilgamesh see, "How to Read Gilgamesh" by Joan Acocella for *the New Yorker* on October 7, 2019. <https://www.newyorker.com/magazine/2019/10/14/how-to-read-gilgamesh>

² The Flood Tablet, The Gilgamesh Tablet Series, The British Museum. https://www.britishmuseum.org/collection/object/W_K-3375



Figure 3. The Nebra Sky Disk. (Credit: State Office for Heritage Management and Archaeology Saxony-Anhalt, Juraj Lipták.)³

This focus on charting and navigating celestial bodies, which was the precursor to the science of astronomy, led to speculations about the existence of life on those bodies. Cosmos was becoming smaller and smaller, and civilizations dreamt of bigger and bigger arenas. The 9th century Japanese folklore *Tale of the Bamboo Cutter* merged this curiosity and the urge to reach the heavens by

³ Nebra Sky Disc, State Office for Heritage Management and Archaeology Saxony-Anhalt. <https://www.landesmuseum-vorgeschichte.de/en/nebra-sky-disc.html>

recounting the story of a princess from the Moon who was sent to Earth by her family for safekeeping during a war.⁴



Figure 4. Hand-illustrated set of three volumes depicting *The Tale of the Bamboo Cutter*, dated to late 17th century. (Credit: The Metropolitan Museum of Art)⁵

Influenced by the myths, legends, and spiritual affiliations of the skies and by careful examination of celestial bodies, ancient scholars of Mesopotamia, Greece, India, China, and Persia developed complex systems of astrology as well as observational and geometrical astronomy. Although the element of awe kept moving such efforts forward, it further introduced new scientific processes

⁴ For a translation of the tale see, Donald Keene, “The Tale of the Bamboo Cutter.” *Monumenta Nipponica* 11, no. 4 (1956): 329–55. <https://www-library-yorku-ca.ezproxy.library.yorku.ca/find/MyResearch/EZProxy?qurl=https://www.jstor.org/stable/2382982>

⁵ The Tale of the Bamboo Cutter, The Metropolitan Museum of Art. https://www.metmuseum.org/art/collection/search/60013157?rpp=60&pg=1&gallerynos=228&ft=*&pos=1

that aimed to solve ‘the puzzle’ of the skies rather than merely admiring and speculating about them.

This short historical recount bears witness to the relationships among attitudes towards outer space present in any period, the discursive formations of that age and the resulting knowledge that forms the ‘truth’ of that attitude. These relationships create an underlying structure which Michel Foucault uses the term ‘épistémè’ to refer to: a structure which forms the conditions necessary for the production of knowledge in a particular time and place.

“[The épistémè’ of a period is not] the sum of its knowledge, nor the general style of its research, but the divergence, the distances, the oppositions, the differences, the relations of its various scientific discourses: the épistémè’ is not a sort of grand underlying theory, it is a space of dispersion, it is an open and doubtless indefinitely describable field of relationships’ (Foucault, 1991: 55)

Moreover, each of the examples of discourses about outer space is evidence of an understanding of the outer space by particular communities in their respective times. This understanding is dependent on the development of the capacities of civilizations and their individual and group attitudes towards their surroundings. Regardless of the orientation of such attitudes -- whether they consider awe, curiosity, or fear – and irrespective of the form of the discursive representation – painting, ancient cuneiform, oral story, folklore, or artifact – such discourses are kept alive by the communities of their practitioners. Klaus Krippendorff (2020) suggests that such images, texts, and cultural artifacts are the ‘material manifestations’ of what discourse communities create, live alongside, and leave behind as legacies. Thus, “discourses become manifest in the discursive artifacts their practitioners generate” (2020:3); therefore, whatever discourse communities create

is of ‘artifactual nature’ which indicates that discourses cannot be comprehended without referring to and studying the communities who lived with them.

As civilizations developed, more complex hierarchical social and political structures emerged. In tandem, discourses on outer space, similar to many other aspects of society, began to be hierarchized as their production and dissemination were directed and controlled by the authority (political or religious institutions) in order to ensure that such discourses mirrored or empowered their ideological, political, or financial positions. During the Middle Ages and in the early Modern period in Europe for instance, the religious authority (the Church) took charge of looking over the study of the heavens, production of astronomical knowledge (written and spoken form and artifacts) and distribution of such knowledge in society. Following Aristotle and Ptolemy, the religious authority of the Middle Ages accepted a geocentric model of the cosmos; a model with Earth at the center of the universe which paralleled the scriptures of the Bible. The Church-controlled discourse promoted Earth as the domain of humans as opposed to the heavens which were the domain of God.⁶ This ideological-led discourse was well protected by the Church and any other discourse which could threaten the sanctioned model was suppressed, degraded, and punished. Nicolaus Copernicus (1473-1543) who proposed a heliocentric model of the universe (arguing that Earth was not the center of the universe and with other planets of the Solar System orbited around the Sun) and Galileo Galilei (1564-1642) whose observations of the movement of the planets and their moons in the Solar System provided proof for the heliocentric model, were both investigated by the Church and their works were deemed heretical.⁷ Giordano Bruno (1548 –

⁶ For an analysis of cosmology in the Middle Ages, see Edward Grant, “Cosmology” chapter in *The Cambridge History of Science*, 2:436–55. Cambridge: Cambridge University Press, 2013.

⁷ For analysis of Copernicus and Galileo’s influence and relationship with the Church see, Allan Chapman. *Stargazers: Copernicus, Galileo, the Telescope, and the Church: The Astronomical Renaissance 1500-1700*. First edition. Oxford: Lion, 2014.

1600), Italian astronomer and philosopher, who proposed an infinite model of the universe saying the cosmos was populated by many worlds, was sentenced by the Roman Inquisition to be burned to death for his heretical ideas.⁸

1.3 Space Race, discourse, and the frontier

Aside from the Scientific Revolution of the early Modern period, significant events in the 20th century led to substantial shifts in the nature, production, and circulation of discourses about outer space. Indeed, imagining unfamiliar worlds with all their peculiarities is one thing, but observing them and attempting to get to them by allocating time, energy, and resources is another. Before we had scientific instruments to show us the realities of those worlds, through discourse they became exotic, omnipotent, full of life (even if only in our imagination), mesmerizing, or fearsome. Since the invention of observation tools like telescopes, realities of many of the worlds in our Solar System and beyond have been demonstrated repeatedly. Sometimes the imagined worlds have been so spectacular and welcoming that discovering the true unfriendliness of their environment is startling.⁹ Some other times, imaginative voyages such as that of Scipio in *Dream of Scipio* (45 BCE) by Cicero, Dante on *Paradise*, final part of his *Divine Comedy* (early 14th century) or Cyrano in *Comical History of the States and Empires of the Moon* (1657) by Cyrano de Bergerac took humans up into outer space enabling them to look back down at Earth with new perspectives and contemplate the meaning of life, death, faith and glory.

One of the important turning points in the history of human-outer space relationship was the development of rockets and subsequently launch vehicles which enabled a new chapter in space

⁸ For further information on Bruno's philosophy and cosmology see, Hilary Gatti. *Giordano Bruno: Philosopher of the Renaissance*. Aldershot, Hants, England: Ashgate, 2002.

⁹ A recent and tangible example of such interconnectedness of imagination and reality happened following several robotic missions to Mars which provided numerous images and large quantities of data about the relates of conditions on the planet. See, Lisa Messeri, *Placing Outer Space: An Earthly Ethnography of Other Worlds*, Durham: Duke University Press, 2016.

exploration by making it possible for humans to reach outer space in reality rather than just in imagination. This new step also led to the emergence of new discourses which were promoted by the military-industrial complex not only to promote but also to justify a rush into outer space which was costly and without consideration for global peace and environmental protection.

Engineers and military scientists in the early 20th century, such as Tsiolkovsky in Russia, Goddard in the US, and Oberth in Germany, were the forerunners of rocket development.¹⁰ Near the end of the Second World War, German military developed the V-2 rocket which changed the paradigms of space travel forever. The V-2 became the first ever artificial object to reach outer space.¹¹ After the war, several members of the original German rocket production team were relocated by the Russian and American governments, the former under Operation Osoaviakhim and the latter under Operation Paperclip, in order to assist in the development of their respective military and space programs.¹² These efforts resulted in the Space Race, which set the foundation for humanity's journey into space.

Development of rockets and the geopolitical competition between the US and the Soviet Union led to the beginning of the Space Race and global space programs. However, it was the imaginative invention of space as a 'new frontier' which ensured their continuation and progress, and this invention was developed and propagated through discourse. In the financially and politically turbulent years following the Second World War and amid constant fear of a nuclear war and the public distrust in technological development, the idea of outer space as a frontier to be reached and

¹⁰ For a short general history of rocket development see, Fraser MacDonald, *Escape from Earth – A Secret History of the Space Rocket*, London: 2019. For a comprehensive survey of the history of rocket development see, Michel van Pelt, *Rocketing Into the Future: The History and Technology of Rocket Planes*. New York, NY: Springer-Verlag, 2012.

¹¹ For a short history of the V-2 rocket and its significance during the Second World War and in the development of spacecraft see, Richard Hollingham, "V2: The Nazi rocket that launched the space age", published on BBC.com on September 7, 2014. <https://www.bbc.com/future/article/20140905-the-nazis-space-age-rocket>

¹² For an overview of the two projects, see, Michael J. Neufeld "Overcast, Paperclip, Osoaviakhim - Looting and the Transfer of German Military Technology." In *The United States and Germany in the Era of the Cold War, 1945–1990, 197–203*, 2004.

conquered was conceived, introduced, and communicated to the general public so astutely that an orbital and planetary ‘land rush’ became to be seen as a divine calling to reach new worlds and to settle them. The American religious and symbolic faith in manifest destiny (a phrase coined by journalist John O’Sullivan in 1845¹³) became the embodiment of the American heroic and national destiny to expand, conquer, exploit, and develop. This faith was a powerful driving force behind the efforts for travelling into outer space by a nation which became the first to land humans on the Moon.

Chesley Bonestell’s popular paintings of Saturn and its moons¹⁴ in the early 1940s were another example of a discourse contributing to the creation of a new concept of outer space. Bonestell’s paintings followed the tradition of the Hudson River School paintings of the American West. The Hudson River School began in the 1830s and was led by Thomas Cole. Its artists played a key role in introducing the westward movement to the American public by portraying the natural world of the West as a source for spiritual growth using their art as cultural and national identity.¹⁵ Bonestell’s paintings with their scientific accuracy and romantic portrayal of the sublime created a sense of possibility and moreover, feasibility towards space exploration.

Perhaps the climax of such effective discourse production was collaboration of Wernher von Braun¹⁶ with Disney in the creation of three specials of *Tomorrowland* in the 1950s.¹⁷ Wernher von Braun was a German aerospace engineer who had helped develop the V-2 rockets in Nazi

¹³ O’Sullivan coined this term in an essay for The United States Democratic Review. v.17 1845 Jul-Dec, where he advocated adding Texas to the United States. Available on HathiTrust Digital Library. <https://hdl.handle.net/2027/mdp.39015018403736>

¹⁴ For a selection of Bonestell’s pieces see, <https://www.bonestell.org/Image-Gallery.aspx>

¹⁵ For further information see, “The Hudson River School” by Kevin J. Avery, published on The Metropolitan Museum of Art website. https://www.metmuseum.org/toah/hd/hurs/hd_hurs.htm

¹⁶ For further details see, “Biography of Wernher Von Braun” published on NASA Marshall Space Flight Center website. <https://www.nasa.gov/centers/marshall/history/vonbraun/bio.html>

¹⁷ For a detailed history of the collaboration, see “The Disney-Von Braun Collaboration and Its Influence on Space Exploration” by Mike Wright, NASA Marshall Space Flight Center Historian. <https://www.nasa.gov/centers/marshall/history/vonbraun/bio.html> for a short retro footage from “Man in Space” published by Disney Family, see “Blast Off! Disney’s Man in Space Rare Footage”. <https://youtu.be/rBgkrhnThek>

Germany and had been brought to the United States under Operation Paperclip after the end of the Second World War. During the war, his V-2 rockets were built by tens of thousands of prisoners of war in concentration camps many of whom died in horrendous conditions. His work for the American ballistic missile program led to the creation of the US Army's Redstone and Jupiter ballistic missiles, as well as the Jupiter C, Juno II, and Saturn I launch vehicles. In collaboration with von Braun and other members of his team, Disney produced and aired three space related episodes of *Tomorrowland*: 'Man in Space' (March 9, 1955), 'Man and the Moon' (December 28, 1955) and 'Mars and Beyond' (December 4, 1957). More than one hundred million Americans watched the first episode of the series, production of which had cost some 1 million USD. *Tomorrowland* revived a positive attitude towards the power of technology following the disillusionment felt after the invention of the atomic bomb and during the Cold War. Through *Tomorrowland* together with *Frontierland*, the American public could witness an ideal past and feel a sense of nostalgia for the frontier and conquest alongside the images of a future that would revive the past they were longing for but this time in the new and extremely vast outer space.

The American national fervor reached its peak with President John F. Kennedy's *Moon Speech* at Rice Stadium which is a paramount example of influential discourse which set the cultural and geopolitical foundations of the American space program. By reverting to historical events as well as emotions and memories of the American public, Kennedy used his speech to not only justify the huge budget to be allocated to the country's space program but also to ensure the American nation that such excessive costs promised "high reward" as "no nation which expects to be the leader of other nations can expect to stay behind in the race for space."¹⁸

¹⁸ For a full transcript and movie clips of the speech see: "John F. Kennedy Moon Speech - Rice Stadium" published on NASA Space Movies Cinema. <https://er.jsc.nasa.gov/seh/ricetalk.htm>

“[They] created an idea.... They wove that idea so indelibly into the hearts and imaginations of Americans by pulling on both historical and religious energies that in only ten years it was hard to remember a time when Americans had not believed space was their new frontier.” (Newell, 2019: 10)

Whereas the Space Race initiated the human venture into outer space, it was public belief and faith in technology, humanity’s capabilities, and an urge to fulfil destiny which helped develop that initial fervor into space programs. This was achieved by tremendous effects of public discourses. For instance, in the United States, every launch or launch failure during the Space Race was televised live and was accompanied by the cheers or tears of the members of the public enabling a deep penetration of a perseverant, and magnificent space program into the public psyche. Furthermore, several iconic works of science fiction authors such as Isaac Asimov, Arthur C. Clarke, Robert A. Heinlein, Ray Bradbury, John Wyndham, Kurt Vonnegut, E. E. Smith, and Philip K. Dick and also popular science magazines like *Collier’s*, *Popular Science Magazine*, *Amazing Stories*, *Popular Mechanics* or *Space World* played an important role in shaping the attitude and approach of the public towards space programs especially in the United States. This led to generations of young people dedicating their lives to developing careers which created the space industry and public support for further exploration of outer space to the point that one could not imagine a past when such activities did not exist. That faith was created through the direct influence of discourses reproduced at different social levels and for different purposes.

1.4 Sustainability, discourse, and outer space

Since the beginning of the 21st century, the world has witnessed immense changes in outer space activities. While at the dawn of space exploration in the 20th century only few states were carrying out a limited range of activities in outer space, today the number of actors is growing rapidly. As

of February 2022, the United Nation Office for Outer Space Affairs (UNOOSA) refers to 41 national and three regional space agencies on its list of worldwide space agencies.¹⁹ Some space activities such as satellite and launch vehicle manufacturing and crew transportation service to and from the International Space Station (ISS) which were previously under the control of governments have now been opened to the commercial sector²⁰ which has also begun offering space tourism²¹ to individuals. Space exploration has changed from a national and localized phenomenon to a global one. As we move into a new age of space exploration with numerous NewSpace²² actors in aerospace industry, a different level of competition and capital flow emerges which introduces change to the speed and nature of activities in Earth orbits. With commercialism comes goods and service-providing goals and less motivation for exploration, protection, or preservation of outer space environment. This shift of market has also encouraged fierce competition among actors which is clearly observable in the telecommunication and satellite sector. These changes concern not only economy and geopolitics but also more importantly environment, resource, and risk management. With the catastrophic consequences of climate change and the destruction of natural resources on Earth, public and commercial space sectors have shifted their focus to utilizing outer space as a lucrative substitute for exploiting Earth.

In proximity to the planet, Earth orbits have been the most widely utilized and experimented upon outer space environment for humanity. Even during the hiatus of activities on other celestial bodies like the Moon in the past decades, Earth orbits have witnessed heavy traffic of satellites, space stations, telescopes, and rocket stages. Earth orbits are accessible with less complex vehicles and therefore are becoming continuously crowded by a large number of human-made space objects.

¹⁹ “Worldwide Space Agencies” published on UNOOSA website. <https://www.unoosa.org/oosa/en/ourwork/space-agencies.html>

²⁰ NASA Commercial Crew Program. <https://www.nasa.gov/exploration/commercial/crew/index.html>

²¹ Learn the latest news about space tourism and space tourist trips into outer space. <https://www.space.com/topics/space-tourism>

²² SatSearch, “Let’s Talk about NewSpace”, <https://blog.satsearch.co/2019-02-26-lets-talk-about-newspace>

According to the European Space Agency (ESA) Space Debris Office, since the dawn of space age in 1957 until April 2022, about 12980 satellites have been launched into orbit, 8,290 of which have remained in orbit. However, only some 5,410 are still operational.²³ In the past decade, these numbers have been increasing exponentially due to the emergence of satellite constellations and mega-constellations.

In parallel, discourses on outer space have also gotten closer to home as Earth biosphere has been suffering hugely from the devastating consequences of climate change. Witnessing the ticking clock of climate change and its impact on the ecology of our planet, global focus has been shifted towards sustainability and sustainable development. Sustainability as an autonomous concept came to life in the second half of the 20th century. The publication of Rachel Carson's *Silent Spring* (1962) raised concerns over the detrimental environmental impacts of pesticides. A few years later in 1968, Paul Ehrlich's *Population Bomb* popularized the notion of overpopulation while Garret Hardin's *Tragedy of the Commons* in the same year warned of exploitation of terrestrial resources. They similarly promoted a kind of development that according to (Brundtland, 1987) "meets the needs of the present without compromising the ability of future generations to meet their own needs". Since then, discourses on sustainable development have grown at a more international level with recent efforts leading to *Agenda 21*, the *Rio Declaration on Environment and Development*, adopted by more than 178 UN member states in 1992 aiming to create a global partnership for sustainable development and protection of environment²⁴ and the *2030 Agenda for Sustainable Development*, adopted by all UN member states in 2015, which

²³ ESA Space debris by the numbers. https://www.esa.int/Safety_Security/Space_Debris/Space_debris_by_the_numbers

²⁴ UNCED: Agenda 21, 1992. <https://sustainabledevelopment.un.org/outcomedocuments/agenda21>

promotes 17 Sustainable Development Goals (SDG) as a proposal for ensuring a more sustainable future.²⁵

For many, discourses on ‘sustainability’ and ‘sustainable development’ are seen as being vague or fluid. Different questions have been raised about the meaning of ‘need’, the definition of ‘time’ or the extent of what is to be sustained, for whom and how. The fact that sustainability discourses have been appropriated at various levels by numerous actors has been frequently discussed by experts from various backgrounds and disciplines. Sustainability discourses have appeared in a time when the planet is facing an ecological crisis which is not a hypothesis of the future or an indeterminate matter. It is generally acknowledged that we have entered a stage of ecological decay which will lead to a collapse unless our current destructive relationship with our biosphere is seriously challenged and altered. This call for a much-needed shift in human-Earth interactions is believed to be missing from the mainstream sustainability discourses which have become dominant. It has been argued that sustainability discourses are promoting a capitalist response to an ecological crisis which reduces human-nature relations to economic and business phenomena and propagates merely a “a renewed strategy for profiting from planetary destruction” (Foster and Clark, 2009: 1). Even though much of the core of international discourses on sustainability originates from debates among the United Nations member states, those discourses have not been inclusive and unbiased. By emphasizing the economic dimensions of progress in their sustainability discourses, international actors create conditions of inequality and injustice not only towards less developed nations (Ala-Uddin, 2019) but also towards the biosphere.

“We are environmentalists now in order to promote something called “sustainability.”

What does this curious plastic word mean? It does not mean defending the non-human

²⁵ UN: Transforming our world, the 2030 Agenda for Sustainable Development. <https://sdgs.un.org/2030agenda>

world from the ever-expanding empire of Homo sapiens, though some of its adherents like to pretend it does, even to themselves. It means sustaining human civilization at the comfort level that the world's rich people-us- feel is their right without destroying the “natural capital” or the “resource base” that is needed to do so.” (Kingsnorth, 2017: 68)

The notion of ‘sustainability’ is also being increasingly used in discourses of institutions and individuals in the space sector through documents and guidelines, mission procedures and reports, manufacturing manuals, informational posters and announcements, conference proceedings, interviews and press releases, campaigns ads as well as social media posts. Although the coverage of space sustainability discussions sometimes extends to other celestial bodies in the Solar System, their focus is mainly on Earth orbits which are the closest to Earth and the most used. While attention to space sustainability is a recent phenomenon, it has been growing in urgency due to the alarming increase of traffic of objects in Earth orbits, impact of rocket fuel emissions in the atmosphere and the growing number of Earth to space weapons (anti-satellite missiles) tests.

Space sustainability has been used as a point of reference for developing numerous tools and indexes for mitigating the effects of human activities in Earth orbits. For example, Murtaza et al. (2020) recommend decreasing the number of launches to ensure the long-term sustainability of outer space, while Popova and Schaus (2018) promote the inclusion of space debris remediation (SDR) in international legal frameworks. However, a closer look at the term – sustainability -- itself has often been overlooked. The term is being used as if it is a given, a term so ‘obvious’ that even questioning its meaning and implications could seem startling.

Institutions, states, and individuals have offered definitions which have in turn become the bedrock of their activities. Perhaps the most widely used and agreed upon of the definitions offered for space sustainability is the one included in the UN Committee on the Peaceful Uses of Outer Space

(COPUOS) *Guidelines for the Long-Term Sustainability (LTS) of Outer Space Activities* (2019) which defines it as “the ability to maintain the conduct of space activities indefinitely into the future in a manner that realizes the objectives of equitable access to the benefits of the exploration and use of outer space for peaceful purposes, in order to meet the needs of the present generations while preserving the outer space environment for future generations”.²⁶

The National Aeronautics and Space Administration (NASA), one of the world’s major outer space operators, refers to its sustainability policy as aiming “to execute NASA's mission without compromising our planet's resources so that future generations can meet their needs.”²⁷

Secure World Foundation, a private foundation dedicated to the promotion of sustainable use of outer space, suggests that sustainability of the space environment means “ensuring that all humanity can continue to use outer space for peaceful purposes and socioeconomic benefit now and in the long term”.²⁸

By looking at these examples, discerning eyes could see that space sustainability is not a simple self-explanatory term but one with an attitude. Several elements which form these definitions are wildly discrepant from the reality of current conditions of Earth orbits. For instance, and in total opposition to what is asserted in the definitions, outer space is not being used for peaceful purposes only. Since the beginning of the space age, military and civilian activities in space have been combined into dual use programs, and space operators have been dependent on military contracts with huge budgets and near-zero publicity. Most military activities in outer space are of a ‘support’ nature using satellites for either aiding ground forces or carrying out reconnaissance missions.

²⁶ UNOOSA: Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space. https://www.unoosa.org/documents/pdf/PromotingSpaceSustainability/Publication_Final_English_June2021.pdf

²⁷ NASA: Sustainability 10. <https://www.nasa.gov/emd/sustainability-101>

²⁸ Secure World Foundation: Space Sustainability, A Practical Guide. https://swfound.org/media/206407/swf_space_sustainability_booklet_2018_web.pdf

Given this, outer space is widely regarded as militarized. However, a quick look at several recent Anti-satellite weapons (ASAT) tests is enough to show that Earth orbits are not only militarized but are also now weaponized.²⁹

The prevailing discourses on space sustainability also talk of equitable access. However, today a system of ‘first come, first served’ is at work in the space sector which gives more opportunities to highly developed rich nations. By the time other nations can develop spacefaring capabilities, there is no guarantee that suitable orbital space will be left for them to operate in. Wealthy nations are leaving tons of space debris behind which might in time make Earth orbits practically unusable. Earth orbits are becoming exceedingly crowded by an increasing number of space debris objects. ESA Space Debris Office estimates some 36500 objects greater than 10 cm, 1,000,000 objects between 1 to 10 cm and 130 million objects between 1 cm to 1 mm are currently present in Earth orbits.³⁰ According to Pelton (2013) the net growth of debris population only in the Low Earth Orbit (LEO), home to most satellite megaconstellation, is at an average rate of 5 percent per year.

In addition, there is no mention of the biosphere and nonhumans in such acknowledged discourses on space sustainability. They also advocate for infinite use of outer space, assuming by default that outer space is an infinite resource which exists solely to serve homo sapiens.

Such ‘generalizations’, ‘ambiguities’, ‘misleading information’, ‘absences’ ‘assumptions’ and ‘abstractions’ are so established in the discourse of space sustainability that are hardly ever questioned. We have used the concept ‘voluntarily’ since it has become our ‘normal’ and ‘natural’

²⁹ For examples of more recent ASAT tests, see: <https://carnegieendowment.org/2019/04/15/india-s-asat-test-incomplete-success-pub-78884> and <https://www.nasa.gov/press-release/nasa-administrator-statement-on-russian-asat-test/>.

For impact of ASAT tests on the amount of debris in Earth orbits see: “Space Debris from Anti-Satellite Weapons” by the Union of Concerned Scientists: <https://www.ucsusa.org/sites/default/files/2019-09/debris-in-brief-factsheet.pdf>

³⁰ European Space Agency, “Space debris by the numbers”.

https://www.esa.int/Safety_Security/Space_Debris/Space_debris_by_the_numbers

way and we rarely consider pausing and asking where it came from. We have come to ‘know’ what space sustainability is. However, the question is: **How do we know what we know?**

We tend to know what space sustainability is, since we have ‘knowledge’ about it or because it is the ‘truth’. We suppose that the majority of the global space sector could not be promoting something that is not true; so, we ‘believe’ and ‘accept’. We have accumulated those truths and knowledge throughout our lives, via educational system, media, entertainment industry, religion, or by following the example of those we have deemed smarter, better, or more powerful. Those truths have reached us in different forms: books and textbooks, movies, conversations, news articles, speeches, pictures and images, tweets and social media posts and artifacts. So, in one word: discourse.

These complex relationships between discourses and the knowledge they create have been deeply affecting the dynamics of progress and power in the space sector. There are several discrepancies between the space sustainability which is promoted by the discourse, and the reality of the current and the projected future environmental conditions of Earth orbits. Political, military, and economic elites have been appropriating the discourse at its roots in order to promote further commodification and exploitation of outer space in favour of geopolitical, military, and capitalist power. In addition, by propagating a discourse aiming to transform the concept of finite outer space environment into an infinite frontier, the elites have been exerting domination and discrimination towards the biosphere. The discourses on space sustainability have ‘normalized’ an attitude and ideology that has been enabling the political, military, and economic elites to follow their own agendas. Considering the importance of these issues, this thesis draws on a sociocognitive approach to Critical Discourse Studies (CDS) in order to investigate such complex relationships.

1.5 A sociocognitive approach to Critical Discourse Studies (CDS)

While traditional schools of Discourse Analysis mainly focus on linguistic analysis of discourse, CDS scholars analyze discourse in relation to its context which makes their methodology problem-oriented and multidisciplinary. By being critical, CDS scholars do not believe in employing a God's-eye view of the society, but they rather emphasize the importance of accepting and utilizing their individual integrated positions in the society which affect all social members all the same. Thus, by being critical, CDS scholars “make visible the interconnectedness of things” (Fairclough, 2010: 39)

“[CDS has] an attitude of opposition and dissent against those who abuse text and talk in order to establish, confirm or legitimate their abuse of power. Unlike much other scholarship, CDS does not deny but explicitly defines and defends its own sociopolitical position. That is, CDS is biased and proud of it.” (van Dijk 2011: 96)

CDS scholars focus their research on social and political problems in the form of political and social inequality. Wodak and Meyer (2015) draw attention to the importance of power in comprehending the dynamics of ‘control’ in social structures, adding that such power is indeed ‘invisible’ and manifests through discourse. This makes it of utmost importance for the CDS scholar to investigate the relations between discourse and power. Thus, CDS critiques how discourses and social power are intertwined.

By discussing the enabling influence of discourse in every period, this research does not imply a concept of power with a capital P but refers to power relations at work in a society which make individuals, agents rather than mere passive victims. Here as well, one is reminded of Michel Foucault's clear opposition to the ‘repressive hypothesis’ where he claims that such concept of ‘power’ is flawed as it does not recognize how power relations are productive since they create

identities, truths, and behaviors. Individuals should not be seen as those who receive power but as those to whom power is presented to and those who resist power.

‘Power must be analyzed as something which circulates, or as something which only functions in the form of a chain. Power is employed and exercised through a net-like organization . . . Individuals are the vehicles of power, not its points of application.’
(Foucault 1980: 98)

Thus, as it will be elaborated in the following chapters, ‘discourse’ is a system of social relations which create knowledge and meaning, and it is ‘material’ in the sense that it produces “practices that systematically form the objects of which they speak” (Foucault, 1972: 49) such as space sustainability. ‘Discourse’ is produced through power relations within a social system and these relations create categories and ‘legitimate’ knowledge which in turn produces ‘truth’ and the truths determine what the people think and therefore they create ‘identity’. As shown by the example of the Church and its control over outer space discourses, through normalization of ‘truth’, other meanings are considered as ‘not truth’ and are either ignored or degraded in order to eliminate any challenging opposition or resistance. The dominant truths and the discourses behind their creation, such as the idea of space as a new frontier and the subsequent call for expansionism, are tools of power created at various levels of social order.

It is through investigating these power relations that this research attempts to account for the fact that discourses on space sustainability are spoken about, and answers questions such as:

- What and whom does space sustainability discourse enable? Whose benefits do these discourses serve and how does the ‘truth’ they have produced aid their creators in creating a position of privilege for themselves?

- How can we begin to know differently? What are some ways to challenge and shift the current discourse into one which speaks not only for the dominated and the manipulated Earthlings but also for Earth?

As shown by their *modus operandi*, CDS researchers aim to investigate ‘power abuse’:

“CDS is not merely interested in any kind of power, but it specifically focuses on *abuse* of power, in other words, on forms of domination that result in social inequality and injustice.”

(van Dijk, 2008: 1)

CDS scholars aim to unravel the ways in which ideologies discreetly reproduce domination and inequality in a social structure; therefore, they argue that since power relations in a social structure are discursive, discourse does ideological work as it is a form of social action. (Fairclough and Wodak, 1997, cited in van Dijk 2005:353) Thus, they take firm and strict stance against the powerful and the elite by investigating the discursive tools they use to exert mental and social control. As a result, CDS scholars stand in support of the dominated via raising awareness by the means of their research and by proposing practices to challenge and resist the powerful and the elite.

While many approaches of CDS explain discourse in reference to its political and social ‘context’, Sociocognitive Discourse Studies (SCDS) asserts that no such direct connection between discourse and society exists unless through the minds of the recipients of the discourse. The relations between discourses and society are cognitively mediated. The connection among discourse, cognition and society and the resulting power dynamics do not work top to bottom but, corresponding to Foucauldian analysis of power, are spread out in several layers of society and do not indicate a mere passive repressive regime but a net of relationships. These relationships are active and

productive as they shape, condition, and guide the cognition of the recipients of the discourse who have agency. The power resulted from the dissemination of the discourses on one hand leads to ‘control’, more discourses, and actions in support of the dominant and on the other hand to resistance and counter-discourse by the dominated. Thus, social power is the ‘control’ exercised by (the members of) one group, institution, or organization over (the members of) another group (for instance the general public). This control is not only over the actions of the dominated but also over their minds, and it impacts (at various levels) the knowledge, attitudes, and ideologies which in turn affects the action of the dominated.

“Power and power abuse, domination, and manipulation, as well as all other illegitimate forms of discourse, interaction and communication are rooted in social structure and relations between social groups... In order to explain how such complex societal structures, influence the actual structures of text and talk, and vice versa, we need cognitive mediation. Such mediation is defined in terms of the shared knowledge and ideologies of group members and how these influence mental models that finally control the structures of individual discourse.” (van Dijk, 2015: 70)

SCDS scholars define ‘control’ in two dimensions: control of the actions of the dominated group (members) and control of their personal and social cognitions (mental models, ideologies, knowledge, and attitudes). The second dimension is of particular importance in SCDS since it involves the cognitive processes of the members, ‘mind control’, which leads to the control of the actions of those members.

“If we are able to influence people’s minds, e.g., their knowledge or opinions, we indirectly may control (some of) their actions, as we know from persuasion and manipulation.” (van Dijk, 2005: 355)

‘Mind control’ acts as an implicit or hidden tool as it shapes social cognition of the public (knowledge, attitude, and ideology) which in turn define and thus control personal mental models that shape their actions in a social structure. This level of implicit control (of mind and action) produces ‘dominance’ as a form of social power abuse.

As a result of this implicit and gradual dominance, members of the dominated groups tend to accept, comply with, or justify such ‘power abuse’ because it appears ‘normal’ to them. The power of the powerful is not only made evident through laws, norms, or rules but also through this ‘normalization’ process or ‘hegemony’. The discourse of space sustainability is an example of such normalization.

SCDS further differentiates between two types of resources used by producers of discourse to create and exert power: material resources including capital, properties and alike on one side and symbolic resources including fame, status, knowledge, and access to public discourse on the other. Both kinds of resources will be explored in this research. Currently, major streams of space sustainability discourse originate firstly from international organizations and states and secondly from the private sector. Although they have some elements in common, their production processes, modus operandi, methods of propagation, scope of outreach, recipients and purpose differ. A sociocognitive discourse analysis of each will be carried out in following chapters.

Chapter Two

2.1 Introduction

The United Nations has been addressing “sustainability” and “sustainable development” via numerous working groups, fora, and plans for the past several decades. Such efforts were established in the 21st century by the Millennium Development Goals (MDGs) which were adopted via the UN Millennium Declaration in 2000. MDGs were formed to call upon the global community to address the growing poverty and detrimental conditions of the poorest nations on Earth. All UN members states committed to help achieve those goals by the year 2015.³¹ MDGs set the foundations for the Sustainable Development Goals (SDGs) which were agreed upon once again by the international community in 2015 to guide their efforts in dealing with a wide range of issues and to “recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.”³²

Transforming Our World: The 2030 Agenda for Sustainable Development is comprised of 17 goals and is “an urgent call for action by all countries - developed and developing - in a global partnership.”³³

³¹ We Can End Poverty: Millennium Development Goals and Beyond 2015. <https://www.un.org/millenniumgoals/>

³² History of the SDGs. <https://sdgs.un.org/goals>

³³ History of the SDGs. <https://sdgs.un.org/goals>

SUSTAINABLE DEVELOPMENT GOALS



Figure 5. The United Nations sustainable development goals (SDG)/UNOOSA

While the MDGs as well as the current SDGs have been focused on the mitigation of predicaments on Earth, extending such international fora and collaboration to outer space is a more recent phenomenon. As mentioned in the previous chapter, discussions on outer space sustainability have been growing in urgency due to the alarming increase of traffic of objects in Earth orbits and the growing fear of further weaponization of Earth orbits.

In line with common international practices, official coordinating discussions on outer space sustainability were hosted by the United Nations and in particular the UN Committee on the Peaceful Uses of Outer Space (COPUOS). The results led to the establishment of the COPUOS *Guidelines for the Long-Term Sustainability (LTS) of Outer Space Activities* in June 2019, which were formed upon the foundations of international space law as indicated in the *Treaty on*

Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty, OST- 1967).

In order to provide a systematic discourse analysis of the relevant elements of the LTS for the purpose of this research, it is essential to investigate the historical chain of events which led to the formation of the COPUOS and the OST in order to examine the overall organization, geopolitical and social dimensions as well as the rhetorical and discursive strategies which have been employed to persuasively present the current views and definitions of “outer space activities” and “space sustainability” to global peoples.

2.2 Cold War, Space Race, and the rise of the OST

Whereas curiosity, wonder and geopolitical competition sparked human presence in outer space, it was a sense of fear and urgency that led to the development of an international regulating regime for that presence.

Long before discussions about international coordination for activities in outer space emerged, the world had acknowledged the importance of international cooperation and coordination in data collection and scientific enquiries. While in the early nineteenth century, individual explorers and their expeditions became the core of scientific discovery, later in the century, the scientific community began to acknowledge the need for systematic observation and data gathering in order to ensure the development of sciences. For instance, in order to study and analyze the world weather, the science of meteorology required data gathering from different regions of the world. A coordinated data collection mechanism could enable meteorologists to record global weather conditions and also to investigate weather patterns. In 1853, a treaty among Belgium, France, the Netherlands, Portugal, Norway, Sweden, Denmark, the United Kingdom, Russia, and the United

States internationalized this mechanism for the purpose of "establishing a uniform system of meteorological observations at sea, and of concurring in a general plan of observation on the winds and currents of the ocean."³⁴ It was not only a sense of 'need' that led to the development of that treaty and the International Meteorological Organization, which was a precursor to the World Meteorological Organization, it was also the recognition of the interconnectedness of conditions and regions of the world which created a shift from a culture of individual exploration and its splendour to a more rigid but scientifically viable internationalized system.

Perhaps among the most notable attempts of the international scientific community in coordinating their efforts was the International Polar Year (1882-83) during which eleven countries agreed to share data, knowledge and observations about the poles in order to study the weather conditions of the Earth polar areas and to analyse the effects of magnetism which can be observed in the polar regions.³⁵ Technological development in science and communication technology in the early 20th century led to the formation of further independent international groups of scientists from different disciplines whose activities became coordinated via the International Council of Scientific Unions which was established in 1931.³⁶ The Council became the focal point for the organization of the Second International Polar Year (1932–33) which synchronised the efforts of 45 countries in the study of the polar regions as well as the Earth atmosphere.³⁷

³⁴ A celebration of the Brussels Maritime Conference of 1853, International Maritime Organization. [A celebration of the Brussels Maritime Conference of 1853](#)

For the complete report of the meetings and the treaty, see: [A celebration of the Brussels Maritime Conference of 1853](#)

³⁵ For a complete history of the International Polar Years, see: Barr, Susan, and Cornelia Luedecke. *The History of the International Polar Years (IPYs)*. 1. Aufl. Berlin, Heidelberg: Springer-Verlag, 2010. <https://doi.org/10.1007/978-3-642-12402-0>

³⁶ International Science Council (ISC): A brief history. [International Science Council \(ISC\), A brief history](#)

³⁷ For more on the Second International Polar Year, see: Laursen, V. The Second International Polar Year, 1932–33. *Nature* 164, 170–171 (1949). <https://doi.org/10.1038/164170a0>

After a hiatus of international scientific coordination during the Second World War, the scientific community planned for a new event which would not only further the exploration of the polar regions but would also promote a study of Earth oceans and atmosphere. This new effort, named International Geophysical Year (IGY), aimed to coordinate relevant international scientific activities from mid 1957 until the end of 1958.³⁸ Following the turbulence of the Second World War and held during the Cold War, International Geophysical Year became politically complicated at various stages. A representative from the Soviet Union objected to the absence of scientists from the Eastern block on the Special Committee which oversaw the organization of the IGY, and the participation of Taiwan in the IGY led to the withdrawal of mainland China. While the IGY and the International Council of Scientific Unions were set to be “outside of politics”, the realities of the global geopolitics cast a shadow over its “apolitical” agenda. (Lai, 2021) However, the event was a success. Tens of thousands of scientists from more than 65 countries joined their efforts. The final agenda of the IGY expanded to beyond the initial projections. Aside from meteorology, oceanography, seismology, and glaciology, the IGY included systematic study and exploration of Antarctica and scientific analysis of upper atmosphere.

The IGY was timed specifically to coincide with a high point of solar sunspot activity which would allow the scientific community to gather data on the effects of high solar radiation on Earth’s upper atmosphere and study aurora, cosmic rays, the ionosphere, and geomagnetism. This study of upper atmosphere was to a great extent dependent on the use of rockets. Both the United States and the Soviet Union had access to the German V-2 rockets which they had captured at the end of the

³⁸ For a history of the IGY, see: Chapman, Sydney. *IGY: Year of Discovery: The Story of the International Geophysical Year*. Ann Arbor: University of Michigan Press, 1959. <https://doi.org/10.3998/mpub.9690193>
For more on the IGY and its connections with the Space Race, see: Teitel, Amy Shira. *Breaking The Chains of Gravity, The Story of Spaceflight Before NASA*. New York: Bloomsbury, 2016.

Second World War and those rockets were modified to reach the upper atmosphere. However, there was a problem. Rockets and the onboard equipment could remain at their target altitude for only moments before plunging back to Earth. The solution would be to be able to launch artificial satellites which could remain in orbit, analyse the data, and transmit it back to Earth regularly. Satellites could also facilitate other areas of study such as weather patterning, meteorological forecast, mapping, and oceanography by providing consistent and regular data gathering and observation. Therefore, after discussions among the members of the Special Committee, an additional theme for the IGY was introduced: Earth Satellite Program.³⁹

The United States was the first country to commit to the IGY Earth Satellite Program. The American participation in the IGY was carried out under the supervision of the United States National Science Foundation, affiliated to the US Government. Their commitment to the satellite program was officially announced in a press release by the office of President Eisenhower on July 29, 1955, in which the US revealed its plans “for going ahead with the launching of small, unmanned Earth-circling satellites” as part of its participation in the IGY. In line with the science-oriented and peace-promoting mainstream discourse of the IGY, the White House press release noted that the American program would “provide scientists of all nations the important and unique opportunity for the advancement of science.”⁴⁰ In a separate joint press release, the US National Science Foundation and National Academy of Sciences announced that the project, which was

³⁹ For details of the scientific programs of the IGY, see: Odishaw, Hugh., S. Ruttenberg, and S. (Stanley) Ruttenberg. *Geophysics and the IGY: Proceedings of the Symposium at the Opening of the International Geophysical Year*. Washington: American Geophysical Union of the National Academy of Sciences, National Research Council, 1958. <https://doi.org/10.1029/GM002>

⁴⁰ For the official copy of the press release see: Press Release, statement by White House Press Secretary, James C. Hagerty on earth-circling satellites as part of IGY program, July 29, 1955. Published on the website of the National Archives - Eisenhower Presidential Library. [Press Release, statement by White House - on earth-circling satellites as part of IGY program, July 29, 1955](#)

“entirely scientific in nature”, would be sponsored by their two respective organizations while “technical advice and assistance will be provided by the scientists of the Department of Defence”.⁴¹

Four days after this announcement, the Head of the Satellite Project Commission of the Soviet Union announced to reporters outside of the Soviet Embassy in Oslo - Norway, that it was “quite possible” that the first Soviet satellite would be launched in two years. Unlike the Americans, the Russians did not disclose details of their project.⁴²

It was from the IGY rocketry and satellite programs that the American and Russian space programs developed. There began the Space Race and from that point onwards, not only the realities of human-outer space relations but also the discourses on those relations shifted tremendously.

It was on October 4, 1957, that the Soviet Union surprised the world by launching the first human-made artificial satellite. *Sputnik I* was a sphere, 58-cm in diameter and had four radio antennas which broadcasted at two different frequencies.⁴³ The beeps of Sputnik, heard on the ground by whoever was tuned in, were the epitome of curiosity and wonder as they echoed the realization of an ancient dream to reach the skies; or perhaps they were so at least in the beginning. A short while after the launch, and mainly by the negative attitude widespread in the discourse of mass media and politicians in the United States, which was the main competitor to the Soviets, dreams and wonder turned into panic, propaganda, and geopolitical rivalry. Therefore, it is important to briefly

⁴¹ For the official copy of the press release see: Press Release by the National Science Foundation and the National Academy of Science, "Plans for Construction of Earth Satellite Vehicle Announced," July 29, 1955. Published on the website of the National Archives - Eisenhower Presidential Library. [Press Release by the National Science Foundation and the National Academy of Science, "Plans for Construction of Earth Satellite Vehicle Announced," July 29, 1955](#)

⁴² New York Time: “Soviet Planning Early Satellite; Russian Expert in Denmark Says Success in 2 Years Is 'Quite Possible'”, August 3, 1955. [New York Time: “Soviet Planning Early Satellite; Russian Expert in Denmark Says Success in 2 Years Is 'Quite Possible'”, August 3, 1955](#)

⁴³ For a detailed history of the development and launch of Sputnik, see: “Sputnik” in De Groot, Gerard J. *Dark Side of the Moon: The Magnificent Madness of the American Lunar Quest*. New York: New York University Press, 2006.

look at the post-Sputnik mainstream American discourse in order to navigate the development of the Space Race that set the foundations of human activities in outer space.

The IGY, in nature, was organized as a global event with merely scientific intentions, during which accomplishments were set to be attributed to the whole of humankind rather than one specific state. This same condition was true with regards to the Earth Satellite Program; thus, the launch of the first satellite was intended to be an apolitical success or a step forward for the world and not for the launching state only. Such over-optimistic intentions became to be seen as naivete not long after the launch of Sputnik. Regardless of the spirit of international cooperation of the IGY, world powers, which managed to reach outer space, created an environment of intense competition for geopolitical, military, and ideological superiority which cast its shadow on global efforts to reach and explore outer space.

The successful Soviet launch came as a surprise to the West due to the underestimation of the capabilities of the Soviet Union and a lack of publicity for its satellite program. Russians had suffered heavy loss of life and infrastructure during the Second World War; therefore, the West imagined them to be backward and struggling to survive rather than technologically developed enough to successfully launch a satellite.⁴⁴ After all, the United States enjoyed a certain technical and military superiority in the world. However, the image of Russia as a backward nation was already not accurate -- as for example, they had carried out a successful test of an atomic bomb in 1949.⁴⁵

⁴⁴ For a commentary on this, see: "They're Miners and They're Peasants" in Mieczkowski, Yanek. *Eisenhower's Sputnik Moment: The Race for Space and World Prestige*. Ithaca: Cornell University Press, 2013.

⁴⁵ For detailed record of event, see: "Soviets explode atomic bomb" [History.com: Soviets Explode Atomic Bomb](https://www.history.com/topics/space-exploration/sputnik)

The aftermath of the launch of Sputnik, which became to be known in the West as the *Sputnik Crisis*, led to a period of anxiety-packed and fear-driven discourses especially in the United States and addressed to the American general public. The crisis was primarily rooted in the Cold War rivalry between the United States and the Soviet Union and was intensified by emotionally provoking discourses which followed the event. Not long after the launch of Sputnik, American media and politicians began a campaign of creating fear and confusion among the general public by recounting possible scenarios in which the Russians could utilize their newly acquired power in space to launch an attack on the US or by warning that the US was falling behind their archenemy, the Soviet Union, in the race to reach outer space.

“In an ideal world, responsible journalists might at this point have sought to educate the public on what the satellite actually meant. But that didn’t happen. Instead of analyzing the news, the press created it.” (DeGroot, 2006: 62)

While Sputnik as the first human-made artificial satellite was an agent of technological progress and a means of access to the skies which humanity had been dreaming of for millennia, in the hands of political elites and mass media it became a discursive tool to control the public attitudes in order to subtly push for political gain and military superiority to begin with.

The *Washington Post*, tapping into the fear and trauma of the public, compared the Sputnik Crisis with Pearl Harbor and its consequences for the US, warning that the launch of Sputnik had caused scientific and psychological drawbacks for the US; and in order to overcome those disadvantages it would be “necessary for the Administration first to assert some aggressive leadership and then to provide whatever talent and money are necessary to right the balance.” (Quoted in Dickson, 2001: 152)

Life Magazine devised a more hyperbolic discursive attitude and wrote on October 21, 1957, that the US had lost the race with the Soviets, cautioning its readers not to pretend that Sputnik was “anything but a defeat for the United States.”⁴⁶

“Sputnik was one of America’s darkest Cold War moments, at least as the press portrayed it.” (Mieczkowski, 2013: 2)

The effect of the Sputnik Crisis in the United States was immense, due to the implications it caused for the country domestically and internationally. In the 1950s and following the Great Depression, the American middle class was beginning to achieve a standard of living which was considered modern and comfortable. (Mieczkowski, 2013) (McDougall, 1985) It was at that time when the Sputnik Crisis hit and caused a sense of American inferiority and vulnerability. A major contributor to such feelings was the use of the R-7 intercontinental ballistic missile (ICBM) for the launching of Sputnik, which alerted Americans to a ‘missile gap’ and caused public panic and political turmoil in the country.

The United States politicians further intensified the alarmist discourses. Senate Majority Leader Lyndon B. Johnson, using a simple metaphor, cautioned the nation that Russians would be “dropping bombs on us from space like kids dropping rocks onto cars from freeway overpasses” (Quoted in Dickson, 2001: 142) The future Senate majority leader, Mike Mansfield took an even stronger stance by saying “What is at stake is nothing less than our survival.” (Quoted in DeGroot, 2006: 69)

⁴⁶ For the full article, see: Dr. C. C. Furnas, 1957. “Why did US lose the Race? Critics Speak Up.” *Life*. October 21, 1957.

Speaker John McCormack defined the conditions as existential saying if the Americans did not respond to the Russian success in Earth orbit, the US would face “national extinction”. He added hyperbolically that “the survival of the free world—indeed, all of the world, is caught up in the stakes.” (Quoted in Wolfe, 1991: 67) This attitude came from a self-proclaimed position as the leader of the free world by the United States.

Soviets launched a second satellite, *Sputnik 2*, on November 3, 1957.⁴⁷ On December 6, 1957, a first American attempt for launching a satellite into orbit named *Vanguard Test Vehicle-Three*, developed by the US Navy, exploded only a few seconds after launch. This failure was televised and led to further humiliation of the US.⁴⁸ Finally, the Army Ballistic Missile Agency together with the Jet Propulsion Laboratory (JPL) built and successfully launched *Explorer 1* on 31 January 1958.⁴⁹ Moreover, as a result of disappointment over the US status in the race for exploring outer space, the country took strong measures in order to ensure that enough emphasis was put on scientific and technological development of the nation, especially in the educational system. For example, the US Congress enacted the National Defense Education Act (NDEA) in September 1958 under which low-interest financial assistance would be provided for college students studying math and science.⁵⁰ National Aeronautics and Space Administration (NASA) began its work in 1958⁵¹ and the budget for National Science Foundation rose from under \$50 million in 1958, to \$136 million in 1959.⁵²

⁴⁷ For details of Sputnik 2, see: [NASA Space Science Data Coordinated Archive: Sputnik 2](#)

⁴⁸ For details of Vanguard Mission, see: [Spaceline.org: Vanguard Fact Sheet](#)

For the video of the launch failure, see: [Vanguard Explosion - 1957 | Today In History | 6 Dec 18 \(AP\)](#)

⁴⁹ For an overview of the Explorer 1 mission, see: NASA, Explorer 1 Overview [Explorer 1 Overview](#)

⁵⁰ See: [History, Art and Archives, US House of Representatives: NEDA](#)

⁵¹ For a complete history of NASA, see: [NASA History](#)

⁵² See: “APPENDIX B, Financial Report for Fiscal Year 1959” in *National Science Foundation, Annual Report 1959* [The Ninth Annual Report of the NSF, 1959](#)

Such development and success were not sufficient as Eisenhower's administration was criticized for its "passive" attitude towards the Space Race. The critics, through public discourse, not only blamed Eisenhower's administration for the missile gap but also capitalized on the Sputnik Crisis for electoral benefit. In opposition to the Eisenhower administration's policies, his critics advocated for technocracy, and they did so by creating the fear of possible confrontation with Russians in the hearts and minds of the general public and through directing the public enchantment with skies and space exploration as a new frontier. It was technocracy that Eisenhower cautioned the nation against in his farewell address in which he warned about the increasing influence and power of the "military-industrial complex" and the "scientific-technological elite."⁵³ The shift towards a more technocratic government was realized with the election of John F. Kennedy as the new President of the United States in 1961.

During his campaign and in an interview with the journal *Missiles and Rockets*, Kennedy had argued that:

“Control of space will be decided in the next decade. If the Soviets control space they can control the Earth, as in past centuries the nation that controlled the seas dominated the continents... We cannot run second in this vital race. To ensure peace and freedom, we must be first.” (Quoted in, Ezell and Ezell, 1978)⁵⁴

One of the strongest traits of Kennedy was his remarkable oratory skills which made his speeches rhetorical tools for moving the American public. As will be shown, his extensive use of rhetorical

⁵³ For the complete transcription of the farewell address, see: [US National Archives: President Dwight D. Eisenhower's Farewell Address \(1961\)](#)

⁵⁴ NASA public archives: "Competition Versus Cooperation: 1959-1962" in: Ezell, Edward Clinton, and Ezell Linda Neuman. *The Partnership: A History of the Apollo-Soyuz Test Project*, NASA Special Publication- 4209 in the NASA History Series, 1978. [The Partnership: A History of the Apollo-Soyuz Test Project](#)

techniques and figures of speech alongside stark warnings, symbolized imageries, and contrasts, showered his audiences with inspiration drawing them in with deeply emotional allure.

In April 1961, a short while after Kennedy's election, Russians set another record when Gagarin became the first human to fly in Earth orbit.⁵⁵ Making the United States a spacefaring nation was a promise Kennedy had made during his campaign, therefore, in May 1961, he addressed the US Congress saying: "It is time to take longer strides — time for a great new American enterprise — time for this nation to take a clearly leading role in space achievement which, in many ways, may hold the key to our future on Earth." Kennedy announced the plan of his administration for "landing a man on the Moon and returning him safely to the Earth" before the end of the decade.⁵⁶

"Americans had indeed been deluded about the extent of their greatness. But Sputnik, while it might have destroyed that misconception, replaced it with something equally misleading. Delusion gave way to illusion. Many concluded that the cure to America's woes, whatever they might be (and no one was quite sure what they were), lay in outer space. Putting men into tiny tin cans and putting those tin cans on top of gigantic roman candles would, it was thought, allow America to be great again." (DeGroot, 2006: 78)

On September 12, 1962, Kennedy delivered his *Moon Speech* at Rice University during which he set the foundations for the future of the American attitude towards exploring space. In one of the strongest examples of a conditioning and influencing public discourse, he painted an image filled with historical, emotional, and national prestige, promoting "advanced space technology". He compared the American effort to reach the Moon with that of British explorer George Mallory to

⁵⁵ For a short history of the mission, see: [History.com Soviet cosmonaut Yuri Gagarin becomes the first man in space](#)

⁵⁶ For the full transcripts, see: [JFK Library: ADDRESS TO JOINT SESSION OF CONGRESS MAY 25, 1961](#)

conquer Mount Everest (Mallory died during his expedition) saying, “we choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard”. In an attempt to restore the faith of the nation after the shock of the Sputnik Crisis, Kennedy reminded the audience of the nature of the American frontier and that the US “was conquered by those who moved forward.” Additionally, in a wisely implicit instance of positioning “we” and positive self-presentation versus “them” and negative other-presentation he cautioned that space exploration promised “high costs and hardships” but also “a high reward” of being the leader of freedom and peace in the world.

“We have vowed that we shall not see it governed by a hostile flag of conquest, but by a banner of freedom and peace. We have vowed that we shall not see space filled with weapons of mass destruction, but with instruments of knowledge and understanding.”

Using parallel sentence structure, Kennedy offered a very inspirational approach. However, such goals and promises cost tremendously for the American public, which Kennedy described as worthwhile, believing that the members of the public would gladly pay for the country’s space program in the aftermath of the Sputnik Crisis as “an act of faith and vision”.

“This year’s space budget is three times what it was in January 1961, and it is greater than the space budget of the previous eight years combined. That budget now stands at \$5,400 million a year... Space expenditures will soon rise some more, from 40 cents per person per week to more than 50 cents a week for every man, woman and child in the United States, for we have given this program a high national priority—even though I realize that

this is in some measure an act of faith and vision, for we do not now know what benefits await us.”⁵⁷

The move towards reaching outer space began with the Russian and American successful launches but also prompted other nations to follow. The first Canadian spacecraft *Alouette-1* and the first British one *Ariel-1* were both launched on American launch vehicles in 1962. American launch vehicles also made the flight of the first Italian spacecraft *San Marco* possible in 1964. Perhaps the most impressive success among the emerging spacefaring nations was that of France who launched their first craft on a French-made launch vehicle *Diamant-1* in 1965, which in time led to the creation of *Ariane* launch vehicles which are still used by the European Space Agency (ESA) and are among the most economical and dependable launch vehicles in the world.

Despite the new dominant alarmist and nationalist discourses, rise of technocratic governments and the new global emphasis on research, science, and innovation, the dawn of human exploration of outer space was as Walter McDougall wisely says, “a time of fear and euphoria both.” (McDougall, 1985: 9) However, as shown in this segment and the coming segments, the military-industrial and scientific-technological elites used the euphoria promote political and capitalist exploitation and militarization of outer space. At the beginning of the space age and through the IGY, it was the common belief that reaching outer space would contribute to global peace and welfare and could revolutionize international coordination and cooperation among nations. However, no such drastic positive global geopolitical transformation happened.

⁵⁷ For a full transcript and movie clips of the speech see: “John F. Kennedy Moon Speech - Rice Stadium” published on NASA Space Movies Cinema. Accessed on Feb 20, 2022. <https://er.jsc.nasa.gov/seh/ricetalk.htm>

It is important to remember that the most powerful rockets of the early space age were created and developed as weapons. The German V-2 rocket technology from the Second World War was used by Germans against the Allies and killed “an estimated 9,000 civilians and military personnel in London and Antwerp during Nazi airstrikes”. (Impey, 2015: 29) Thus, in a period when the world was living in terror of nuclear weapons, use of ICBMs was alarming regardless of what they were used for. The United States and the Soviet Union both had developed ballistic missiles for carrying nuclear warheads. The United States had very efficient bombers stationed in allied countries near the Soviet borders and the Soviet Union successfully tested its ICBM via the Sputnik launch showcasing its capability to reach distant targets. The early discourses placing outer space exploration among other peaceful international scientific efforts were replaced by those of fear and uncertainty amid nuclear tensions of the Cold War. After the launch of Sputnik, the international community started to consider methodology that would limit the reach of the Cold War in outer space. The two superpowers and forerunners of human exploration of outer space responded to the concerns of the international community by reiterating that outer space had to be used for scientific purposes. However, as shown in the next segments of this research, such remarks were merely made in order to safeguard support of their respective public as well as the international community to continue expanding their space programs.

Following the discussions at the United Nations against the military use of outer space, in 1958, the Soviet Union submitted a draft resolution to the UN offering “the banning of the use of cosmic space for military purposes” in return for “the elimination of foreign military bases on the territory of other countries”.⁵⁸ It was clear that the Soviet Union was referring to the American bases in allied countries, therefore, the United States rejected the proposal. The US on the other side

⁵⁸ For the full text of the Soviet draft, see: [UNOOSA Records Library: Document A/C.1/L.219/Rev.1](#)

proposed the issue of disarmament to be discussed in the Disarmament Commission while peaceful uses of outer space to be addressed by a new committee formed specifically for outer space activities. (Lai, 2021) Thus, the US considered militarization of outer space and using outer space for peaceful purposes to be two separate matters, since only a few highly capable countries were concerned with disarmament while all countries were interested in scientific studies of outer spaces.

The UN First Committee, which “deals with disarmament, global challenges and threats to peace that affect the international community” and works closely with the United Nations Disarmament Commission⁵⁹, was given the task of exploring the proposals and coming up with a homogenous plan for addressing global concerns over outer space exploration. Following months of endless political dispute, on December 13, 1958, the UN adopted Resolution 1348 (XIII) which led to the creation of the ad hoc Committee on the Peaceful Uses of Outer Space (COPUOS) that started its work, without the Soviet Union, in 1959. The committee formed two subcommittees: One to deal with scientific and technical issues of space exploration, and the other to survey and identify legal matters arising from human activities in outer space.⁶⁰

The scientific subcommittee concluded that outer space should be used for scientific investigations for furthering human welfare, improving weather forecasting and radio communication, Geodetic and mapping satellites (improving the view of the size and shape of Earth and the distribution of land masses and water as well as charting the less explored regions of the world) , gathering data on geographical details of Earth (which may be of economic and scientific

⁵⁹ General Assembly of the United Nations: [UN.org Disarmament and International Security \(First Committee\)](https://www.un.org/disarmament/)

⁶⁰ For full text of the Resolution, see: [UNOOSA Records Library: RES 1348 \(XIII\)](https://www.un.org/Depts/los/convention_agreements/docs/other/RES_1348_XIII.pdf)

significance), deploying navigation satellites (provide the basis for an all-weather long-range navigation system for surface vehicles and aircraft) and launching crewed space flight for exploration.

Following the example of principles and regulations “developed in the past to govern the use of such areas as the air space and the sea” the legal subcommittee noted that “outer space is, on conditions of equality, freely available for exploration and use by all in accordance with existing or future international laws or agreements” and “should be used for peaceful purposes only”.⁶¹

Even though the ad hoc COPUOS report had offered a detailed scientific and legal survey, it lacked any legal or international power to make recommendations or set standards for international frameworks needed to analyze and regulate the identified issues. Therefore, it was essential for the committee to become permanent and to have the resources and the authority to work. For this purpose, the Soviet Union as a forerunner of space exploration had to be part of the committee. By the end of 1959, the US and the Soviet Union reached an agreement to add 8 socialist members to the original 18 members of the COPUOS committee in order to meet the condition set by the Soviet Union to join the COPUOS. In December 1959, the UN adopted Resolution 1472 (XIV) which led to the formation of a permanent COPUOS and gave it two years, 1960 – 1961, to convene and expand on the work done by the ad hoc committee.⁶² However, during the two-year period the committee only met once, and no further activities were carried out. The years 1960 and 1961 were those of deterioration of relations between the US and the Soviet Union when the two powers collided on numerous occasions on land and acted in fierce competition in outer space. In August

⁶¹ See: Report of the Ad Hoc Committee on the Peaceful Uses of Outer Space, July 14, 1959. [A/4141: Report of the Ad Hoc Committee on the Peaceful Uses of Outer Space](#)

⁶² Resolution 1472 (XIV), December 12, 1959, [UNOOSA Records Library: Resolution 1472 \(XIV\)](#)

1961, the Soviet Union erected the Berlin Wall and in the next 2 months, they detonated some 50 nuclear bombs in a series of tests (Yang, North and Romney, 2000). From late 1961 until mid-1962, the US also carried out 44 nuclear tests under Operation Nougat.⁶³

Also in outer space, rules of competition had changed since the Soviet Union sent a dog, Laika, aboard a *Sputnik 2* to space in November 1957. The fact that the capsule carrying Laika was not well protected and that Laika did not survive the journey did not seem to matter but rather what was popularized was that Russians had managed to send the first living being to Earth orbit. As of that day, the battle of superpowers in space was shifted towards who could successfully send living beings into outer space. The fact that the technology was lacking and complications of human travel in outer space were beyond imagination did not seem to matter as the two sides realized that only popularizing human presence in outer space would motivate and mobilize their respective nations into sacrificing of their capital and even their lives for traveling into space.

“Exploration could have been carried out by robots, but robots could never be heroes.” (DeGroot, 2006: xiii)

Global crises renewed nuclear tests, fast-growing pace of activities in outer space, and insistence on sending humans into space led to an international re-focus on disarmament to prevent the extension of the Cold War into Earth orbits. While the US and the Soviet Union restarted bilateral disarmament talks, India, Australia, Canada, Italy, and the US submitted a draft resolution on the importance of international cooperation in peaceful uses of outer space. Following several discussions held at the UN General Assembly, on December 11, 1961, the US, and Soviet Union, in coordination with 22 other member states, submitted a joint resolution on the peaceful uses of

⁶³ For details of the Operation, see: [Nuclear Weapons Archive: Operation Nougat](#)

outer space. This joint resolution called for the establishment of official and binding rudimentary laws for activities in outer space and the recommencement of the activities of the COPUOS. The resolution proposed two fundamental principles for human activities in outer space: firstly, no country can assert ownership to any part of outer space and secondly, international law should be extended to outer space. Finally, on December 20, 1961, the UN adopted the two fundamental principles in Resolution 1721 (XIV) and adopted Resolution 1722 (XIV) for continuing the debates on disarmament.⁶⁴

Negotiations on a ban on nuclear testing proved to be difficult as both the Soviet Union and the US continued with their tests. Aside from ground tests, the US resumed atmospheric ‘high altitude’ nuclear tests under Operation Dominic beginning in April 1962.⁶⁵ It was not the first time the US carried out such tests. In August and September of 1958, the US had secretly conducted high altitude atmospheric nuclear weapons tests over the South Atlantic Ocean under Operation Argus and had disguised them under the cover of scientific experiments during the International Geophysical Year.

The first atmospheric test in 1962, codename Starfish, launched a nuclear warhead to the altitude of 250 miles (400 kms) where it detonated and created a powerful electromagnetic pulse (EMP). The US announced the objective of the test to be the study of the possibility of creating an antimissile operation which could destroy incoming missiles or render their guidance and communications system inoperable. The resulting EMP caused damages on the ground in Hawaii and in space (it had damaged 2 US navigation satellites and the UK’s Ariel 1 satellite).⁶⁶

⁶⁴ For full text of Resolutions 1721 and 1722 (XIV), see: [UNOOSA Records Library: RES 1721 \(XIV\) and RES 1722 \(XIV\)](#)

⁶⁵ For media gallery of Operation Dominic, see: [Atomic Archive: Operation Dominic](#)

⁶⁶ For details of the tests under Operation Starfish, see: [Smithsonian Magazine: Going Nuclear Over the Pacific](#) and [Wired: Starfish and Apollo \(1962\)](#)

Discussions about disarmament and peaceful uses of outer space did not seem to bear much fruit due to the complexities of the global geopolitical environment and the fact that the Eastern and the Western blocks could not set their many differences aside. However, the matter of the Cuban Missile Crisis changed the paradigms. On October 14, 1962, the Soviet Union was spotted by an American U-2 flight to be installing missiles in Cuba. The SS-4 missiles had the capability to reach most of the US, including Washington DC. The US launched a complaint to the UN and began a naval blockade to block the Soviet Union's access to Cuba. The crisis kept intensifying as the Soviet navy approached the American blockade and an American U-2 was downed over Cuba. As the crisis began to threaten to result in a nuclear Armageddon, Americans and Soviets started negotiations behind closed doors which eventually resolved the crisis. However, the incident raised several alarms among the international community and reminded them of the dangers of a nuclear war in outer space. At last, in October 1963, the Disarmament Committee submitted a draft resolution proposal to the UN General Assembly calling for a ban on "placing in orbit around the Earth any objects carrying nuclear weapons or any kinds of weapons of mass destruction, installing such weapons on celestial bodies, or stationing such weapons in outer space in any manner." The draft was adopted by the UN as Resolution 1884 (XVIII).⁶⁷

In November 1963, COPUOS formally adopted a draft Declaration for the basic framework to be considered for activities in outer space to be submitted to the UN General Assembly the following year. This draft Declaration of Legal Principles Governing the Activities of States in the Use and Exploration of Outer Space included nine articles. The Declaration, while not binding legally, was considered a major step in the development of international space law. This was followed by the adoption of Resolution 1884 (XVIII) in October 1963 which banned placement of weapons of

⁶⁷ For a complete collection of Resolutions adopted on the reports of the First Committee, see: [UNDOCS: A/RES/1884\(XVIII\)](https://undocs.org/A/RES/1884(XVIII))

mass destruction in space and at last the adoption of the Declaration on December 13, 1963. The next step for the international community was to turn this Declaration into a treaty which would be legally binding. After drafting and redrafting of the Treaty, on December 19, 1966, the UN General Assembly commended it for adoption via Resolution 2222 (XXI).⁶⁸

In a symbolic show of agreement and coordination, on January 27, 1967, the Soviet Union, the US, and the UK held simultaneous signing ceremonies in their capital cities.⁶⁹ The treaty bans states from claims of sovereignty over the Moon or other celestial bodies. Under its terms, states are responsible for their activities (governmental and non-governmental) in outer space and are liable for any damage caused by objects launched into outer space from their territory. It is also declared that the exploration and use of outer space shall be for the benefit of all countries and outer space shall be free for exploration by all states. The treaty also bans states from placing nuclear weapons or weapons of mass destruction in Earth orbits or from stationing them on other celestial bodies. States are also required to assist astronauts in distress regardless of their nationality and shall avoid harmful contamination of outer space.

While the OST has served as the foundation of international regulatory system for activities in outer space and its presence has for certain been favourable to its absence, its unclear and inefficient discursive elements as well as a lack of update to its provisions considering the tremendous developments in space industry have made it a tool in the hands of the political-military-industrial elites to use to their own benefit. These aspects will be discussed in the following segments of this thesis.

⁶⁸ For the full text of the Resolution, see: [UNOOSA RES 2222 \(XXI\)](#)

⁶⁹ For the video record of the signing of the OST by the Soviet Union, the US, and the UK, see: [YouTube: Signing of the Outer Space Treaty of 1967](#)

In time, the OST was followed by four other treaties which together form the basis of international space law. The five treaties are as follows:

- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty) 1967
- Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space (Rescue Agreement) 1968
- Convention on International Liability for Damage Caused by Space Objects (Liability Convention) 1972
- Convention on Registration of Objects Launched into Outer Space (Registration Convention) 1975
- Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement) 1979.

A treaty is a binding international contract between countries as those countries officially agree to its terms. William Slomanson in *Fundamental Perspectives on International Law* defines a treaty as “a generic term covering all forms of international agreement in writing concluded between states.” (Slomanson, 2011:351) Article 2 of the Vienna Convention on the Law of Treaties defines treaty as “an international agreement concluded between States in written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation.”⁷⁰ Thus, The Outer Space Treaty (OST) serves as the bedrock of international space law and is the most ratified and signed treaty among the five (ratified

⁷⁰ For the full text of the Convention, see: [United Nations, Office of Legal Affairs: Vienna Convention on the Law of Treaties 1969](#)

by 111 and signed by 23 member states).⁷¹ The Moon agreement was the last binding instrument and since then, only non-binding agreements have been reached by the international community. Provisions and guidelines of space law have been focal points of reference for crewed and uncrewed space activities for several decades. However, only some components of space law (treaties and resolutions) are legally binding and even those components have not been signed or adopted by all the members of the United Nations. A majority of the binding agreements were drafted and passed at the initial stages of space exploration in the 20th century and have not been properly brought up to date with the fast-moving pace of technological, environmental, geopolitical, commercial, military and financial developments of the space sector in recent years. In the absence of an updated and holistic regulating mechanism for outer space activities, what has been developed and promoted instead is ‘soft law’ which includes a set of non-binding and voluntary guidelines, best practices and tools which have been somewhat effective in putting together procedures and checklists among actors in the space industry. A portion of these guidelines have been adopted into national legislations by some member states or have been referred to in planning and operational stages of space activities.

2.3 Long-Term Sustainability of Outer Space Activities Guidelines (LTS)

The UN COPUOS *Guidelines on the Long-Term Sustainability of Outer Space Activities (LTS)* is one example of “soft law” which is not legally-binding. As with any other form of discourse, it is important to first look at some general aspects of the LTS before investigating the discursive aspects of the text. These general aspects include elements such as genre, imageries, the reasons

⁷¹ UNOOSA. Status of International Agreements relating to activities in outer space.
<https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/status/index.htm>

behind and the goals of its production, the production process, and the involved parties in that process as well as its implementation and dissemination.

The LTS Guidelines are the result of the eight-year mandate of the Working Group on the Long-Term Sustainability of Outer Space Activities established by the COPUOS in 2010. The discussions were led by four ‘expert groups’ from the member states, 70 in 2010, discussing several themes including “sustainable space utilization”, “space debris mitigation”, “space situational awareness” and “regulatory regimes and guidelines” for space actors. The expert groups also received input from other UN bodies and inter-governmental and non-governmental entities. As noted in the Report of the Scientific and Technical Subcommittee on its forty-seventh session, held in Vienna from 8 to 19 February 2010, any guidelines developed by the Working Group could only “be implemented on a voluntary basis” and the Working Group could not “seek to develop new legal regimes, but rather encourage greater adherence to” the five treaties for governing outer space activities already in place.⁷²

The expert groups submitted their reports, considerations, and recommendations in 2014 and by 2016 the Working Group consolidated the reports and submitted them for the view of the members. Any COPUOS decision must receive complete consensus of all its member states which stood at 87 by that time, meaning that all member states had to reach agreement on the text of every single one of the recommended guidelines. Certainly, the progress was slow. However, by June 2016, COPUOS reached agreement on the first 12 guidelines and nine more guidelines were agreed upon

⁷² For the full report, see: [UN General Assembly, Report of the Scientific and Technical Subcommittee, February 2010](#)

by 2018. It was in February 2018, that COPUOS reached agreement on the definition of “space sustainability” as stated in the Guidelines.⁷³

The result formed the 21 LTS Guidelines which were adopted by the committee in 2019. The latest copy of the LTS was published by the UN Office for Outer Space Affairs (UNOOSA) in 2021⁷⁴ and is comprised of 38 pages which are grouped into four sections:

- A. Policy and regulatory framework for space activities
- B. Safety of space operations
- C. International cooperation, capacity building and awareness
- D. Scientific and technical research and development

The booklet begins with a cover page showing a satellite image taken of Big Island in Hawaii clearly portraying the mountain range, the vegetation, the coast, and the blue waters in bright colours. The use of this photo on this page is curious. The image could be a reference to one of the most important contributions of outer space exploration for our civilization: satellite imaging. Therefore, the image could be calling upon the reader to remember the benefits of human activities in outer space. However, this image is striking as it does not convey the urgency pushing toward the formation of the LTS and the necessity of addressing what the Guidelines describe as “developments and risks” in Earth’s orbital space. As it will be shown in later segments, the effect of the discourse of the LTS is not through the technical guidelines per se but through the

⁷³ For the history of relevant COPUOS discussions, see: [UNOOSA: Long-term Sustainability of Outer Space Activities](#)

⁷⁴ For the full text of the Guidelines, see: [UNOOSA: Guidelines for the Long-term Sustainability of Outer Space Activities of the COPUOS, Vienna 2021](#)

foundations on which such guidelines were created. This image is an introduction to the absences, ambiguities and conditioning discursive properties embedded in these foundations.



Figure 6. Cover image of the LTS guidelines published in Vienna in 2021

The above-mentioned foundations are presented in Part I of the Guidelines under the heading *Context of the guidelines for the long-term sustainability of outer space activities*. The Context is then divided into five subheadings as follows:

1. Background
2. Definitions, objectives, and scope of the guidelines
3. Status of the guidelines
4. Voluntary implementation of the guidelines
5. Review of implementation and updating of the guidelines

The LTS begins by setting the stage for the necessity of having the guidelines by describing the Earth's orbital space environment as “a finite **resource**” which “is being **used**” by an increasing number of actors such as states as well as international intergovernmental and non-governmental entities. Thus, setting the fundamental focus and urgency of the discussions in the LTS is based on “exploitation” rather than “exploration”.

Furthermore, it is noted that the increase of space debris, the complexity of space operations, the emergence of mega-constellations and the increasing risk of collision as well as interference with the operation of space objects have impacts on the long-term sustainability of space activities. Thus, the “voluntary” LTS Guidelines offer a “holistic approach” in order to promote the long-term sustainability of outer space activities “in particular, enhancing the safety of space operation” through “international cooperation”.

The most fundamental segment of this introductory part of the Guidelines is the definition of “long-term sustainability of outer space activities” offered and agreed upon by the committee members which is as follows:

“The long-term sustainability of outer space activities is defined as the ability to maintain the conduct of space activities **indefinitely** into the future in a manner that realizes the objectives of **equitable access** to the **benefits** of the exploration and use of outer space for **peaceful** purposes, in order to **meet the needs** of the present generations while preserving the outer space environment for future generations. This is consistent with, and supports, the objectives of ... the Outer Space Treaty, as such objectives are integrally associated with a commitment to conducting space activities in a manner that addresses the basic need to ensure that the environment in outer space remains suitable for exploration and use by current and future generations. States understand that maintaining exploration and use of outer space for peaceful purposes is a goal to be pursued **in the interest of all humankind.**”

This definition serves as the basis for all the components of the guidelines since their objective is “ensuring and enhancing the **long-term sustainability of outer space activities**”. The critical and significant but also underrated influence of the definition is obvious. Tremendous importance has been directed towards the tools and mechanism (the guidelines themselves) rather than the fundamental ground upon which such regime has been developed. The way “outer space sustainability” has been defined is essentially overlooked and the definition itself has been repeatedly cited in numerous contexts in the space sector in such ways as relatively flawless and apparent. This argument will be discussed in detail in the upcoming segment.

The Context section of the guidelines then clarifies the status of the LTS as being “voluntary” and “not legally binding under international law” reiterating that the current UN treaties governing outer space activities provide the legal framework for the guidelines. Therefore, “states and international intergovernmental organizations should voluntarily take measures, through their own national or other applicable mechanisms, to ensure that the guidelines are implemented **to the greatest extent feasible and practicable, in accordance with their respective needs, conditions and capabilities**, and with their existing obligations under applicable international law.” It is also noted that the COPUOS remains the “principal forum” for any further discussions arising with regards to the LTS Guidelines and the committee may revise and review the guidelines to continue their effectiveness “to promote the long-term sustainability of outer space activities” once again as has been defined in the earlier segment. Since the LTS Guidelines are devised in direct relation to the OST as the basis of international space law, references will be made to that treaty alongside, in order to situate the discursive points of interest in the definition and the context information offered in the document.

2.4 Exploration and use of outer space for peaceful purposes

The phrases “peaceful purposes”, “peaceful uses” and “peaceful exploration and uses” appear in the LTS Guidelines 24 times. Since the Guidelines refer the readers to the OST for an understanding of its fundamental principles, no further clarification or discussion is provided regarding the implications of applying those phrases. Therefore, the same fluidity and ambiguity with regards to the phrase in the OST is extended to this new text which was developed some four decades after the OST.

Vague and implicit meanings create manipulative discourses which are controlled by “dominant political, bureaucratic, media, academic or corporate elites.” (van Dijk, 2006: 372) By elites, this segment refers to the military industrial complex, including aerospace lobbyists who discursively manipulate the recipients of the discourse by using a certain conceptually unclear phrase repeatedly as a notion that is true and given. The elites have been hiding behind a phrase which has become a tool to help them contain their warmongering attitude in Earth orbits. This puts the whole planet at risk of a destructive armed conflict. The elites also spend billions of dollars of military funding, only a small portion of which could facilitate numerous other beneficial and constructive activities in Earth orbits such as debris management and prevention strategies.

While the UN Charter has been the framework upon which appropriate behaviours among states have been developed, international treaties and resolutions have been used to further expand upon such interactions. This has also been the case with regards to state activities in outer space. At the dawn of the Space Race in the 1950s, many concerns were raised about the extension of the on-the-ground military conflicts to outer space, particularly to Earth orbits. Such concerns were the main thrust for the creation of an international mechanism for governing human activities in outer space which would build upon international law but would also take into consideration special properties of outer space which make it different from other domains on Earth. One of the key outcomes of such discussions was the assertion that outer space should be used for “peaceful purposes”. While the involved parties in those debates (UN member states) insisted on the necessity of a “peaceful” nature for human activities in outer space, they could hardly agree on the scope and meaning of that term. Years of debate and political arguments were not fruitful in that regard, since this key phrase, which has become the bedrock of every discussion on activities in outer space including the LTS Guidelines, has not had a homogenous and consistent interpretation

among the global community. As the first fundamental term of reference governing human activities in outer space, “peaceful purposes”, is not only generalized but is also ambiguous. The fluidity of the language which has been applied to the OST and is subsequently extended to the space sector and the general public is not only misleading and manipulating but also harmful and detrimental.

As mentioned in the previous segment, states have been using Earth orbits for various purposes since the launch of Sputnik. Scientific, commercial, and military developments in outer space have advanced tremendously. The world has become reliant on outer space since space-based technology has been an integral part of the function of telecommunications, commerce, energy, health, environment and climate patterning, remote sensing, and military operations.

Civilian and scientific space operations provide data for exploration and understanding of outer space and assist us in analysing Earth orbital environment and terrestrial conditions for weather, climate and environmental analyses and evaluation. Crewed spaceflight missions, International Space Station and uncrewed scientific missions are examples of such activities. These activities are mainly carried out by governmental and intergovernmental entities and are also the ones which receive the highest amount of publicity as they tap into an exciting feeling of curiosity and adventure. This publicity is done through countdown and live launch broadcasts, detailed analysis, and description of the projects for public view on online platforms, exclusive social media accounts dedicated to specific projects and interview with operators.

Commercial activities include those operated mainly by the private sector which provide services in order to make profit. Telecommunication satellites, rockets and launch vehicles, cargo, and more recently crewed flights to and from the International Space Station and space tourism (such as

suborbital flights) are among space operations carried out by commercial entities. While the private sector space operations have also been receiving increasing amount of publicity, the publicity has been mainly coordinated and managed by private sector actors themselves; therefore, the information has been contained and used as a channel for advertising and facing competitors rather than informing and explaining.

Military and intelligence outer space operations include reconnaissance, surveillance, and national security (offensive and defensive) activities. Satellites have been used by states for space-based surveillance to gather intelligence and monitor adversaries during both peace time and during conflicts; therefore, they have had direct impact on the outcome of conflicts on Earth. The use of intercontinental ballistic missiles and more importantly the existence of Research and Development (R&D) programs in the military have linked outer space domain not only to intelligence gathering and remote sensing but also to the development of new weapons systems (space-based, Earth to Earth through space, space to space, Earth to space or space to Earth). Intelligence and military activities in outer space receive minimal to zero publicity under the guise of being classified for national security. Thus, the minute available information is from declassified sources, intelligence leaks, or is interpreted or hypothesized through observing relevant data. It is important to remember that even though there are satellite launches exclusive to military and intelligence operations, civilian launches are also directly related to or accessed by defense and military entities in their respective owner states and the data produced by those civilian satellites is easily attainable by states. Civilian and military missions use the same launch vehicles, platforms, and satellites. A GPS satellite can be used for civilian activities, but it can also guide weapons to targets as will be shown in this segment. Aside from that, the aerospace industry is

heavily dependent on military contracts, and aerospace companies regularly compete for securing such high-bidding contracts.

Civilian and military dual use of outer space is among the most troubling of developments in Earth orbits. Over the years, stories of travelling to space have traditionally been associated with astonishment and the discovery of new horizons. Today, those dreams are being rewritten into nightmares as images of wars and weapons in outer space are replacing those of adventure and learning. The advancement of aerospace technologies in the world has always been coupled with national security, military prowess, and national defense.

World powers began using satellites for military and intelligence purposes soon after the launch of Sputnik. The two world powers of the Cold War and Space Race have both been among the most active states in space military operations. The American CORONA program, a series of photoreconnaissance satellites, was operated by the Central Intelligence Agency (CIA) and U.S. Air Force starting in 1959.⁷⁵ The project was cloaked under the guise of scientific missions called *Discoverer*. In 1959, aerospace was included in the US Air Force new mission statement (Terry 1991)⁷⁶ and US Space Command was formed in 1982 and was later renamed to US Air Force Space Command (AFSPC).⁷⁷

It was by using satellites that military forces achieved an ultimate high ground under the premise that as Meyer and Stallings (2011) put it, “placing systems in orbit provides advantages consistent with the military doctrine of high ground”. Satellites as ultimate observational tools have been

⁷⁵ For details of the program, see: “CORONA: First American Satellite Program” in *CIA Cold War Records*, CIA Library [Archived Version - CIA Library: CORONA Program](#)

⁷⁶ Terry, Michael R. “Formulation of Aerospace Doctrine From 1955 to 1959.” *Air Power History* 38, no. 1 (1991): 47–54. <http://www.jstor.org/stable/26272295>.

⁷⁷ For a history of US Air Force Space Command, see: [US Air Force Space Command: History](#)

providing military forces with data, giving them advantages in the battlefield. Armies and military forces throughout history have been searching for higher observation positions which could make them superior against their adversaries. Hills and mountains were replaced by towers and observation posts, hot air balloons and eventually airplanes. While satellites have not yet been used directly as weapons, they have been utilized as ultimate Intelligence, Surveillance, and Reconnaissance (ISR) ‘eyes in the sky’ which have shaped the fate of numerous terrestrial conflicts in recent decades.

During the Iraq War (2001), the United States used weather satellites, military communication satellites, and Earth orbiting GPS satellites to image and analyse the battlefield on the ground. On the ground, armed forces used the space-based data to locate their targets and chart a path to those locations while avoiding or preparing for any hindrances on the way. Only months before 9/11 and the Iraq War, in January 2001, *Report to the Commission to Assess United States National Security Space Management and Organization* was submitted to the US Congress in which the country was prompted to “to act responsibly and soon enough to reduce U.S. space vulnerability” in order to prevent “a space Pearl Harbor”. The report called for “establishing space as a national security priority” to conduct “operations to, from, in, and through space in support of [the US] national interest both on the earth and within space” in order to “have the capabilities to defend its space assets against hostile acts, and to negate the hostile use of space against U.S. interests.”⁷⁸

However, it was earlier during the Gulf War in 1991, which has been called the world’s “first satellite war” or “first space war”, that the US Air Force’s NAVASTAR Global Positioning System began assisting US troops in navigating the terrain in Kuwait and provided GPS-equipped cruise

⁷⁸ For the full report, see: [January 2001: Report to the Commission to Assess United States National Security Space Management and Organization](#)

missiles, helicopters, and stealth planes for precision hit on targets. In that war, satellites became “enabler of war”. After the Gulf War, the US Army initiated installing GPS receivers on all its armoured vehicles (deGrasse Tyson and Lang, 2018: 331-334)

Military reconnaissance satellites, also called spy satellites, have been increasingly and continuously used by their operators for tactical purposes in conflicts on Earth. In other instances, hundreds of GPS-guided joint direct attack munition (JDAM) were used in the Kosovo War and thousands of them were employed in the Afghanistan war of 2001-02 and in the Iraq war in 2003. (O’Hanlon, 2004)

In June 2018, US President Donald Trump directed the US military to establish a Space Force. In his speech on June 18 of that year he described the essence of the American character as "taming new frontiers" and added that the American identity in space is not only a matter of national identity but a matter of national security.

"It is not enough to merely have an American presence in space. We must have American dominance in space." ⁷⁹

One year later in August 2019, the establishment of the United States Space Command was authorized as a preparation for the initiation of Space Force. According to Trump, the Space Force's mission would be to "organize, train and equip warriors." ⁸⁰ As the newest branch of US Armed Forces, US Space Force (USSF) is a “military service” that “organizes, trains, and equips space forces in order to protect U.S. and allied interests in space and to provide space capabilities

⁷⁹ “Trump directs establishment of U.S. force to dominate space” *Reuters*, June 18, 2018. <https://www.reuters.com/article/us-space-moon-trump-idUSKBN1JE28D>

⁸⁰ Katie Rogers and Helene Cooper, “Trump Authorizes a Space Command. Next, He Wants a Space Force.” *The New York Times*, August 29, 2018. <https://www.reuters.com/article/us-space-moon-trum>

to the joint force.”⁸¹ USSF further established the Space Operation Command which is designated as “USSF’s fight-tonight force” that “generates, presents, and sustains combat-ready intelligence, cyber, space and combat support forces” and its vision is to train “America’s Space Warfighters—Always Ready, Always Innovative, Always Above”.⁸² The US Space Force has secured a budget of 24.5 billion USD for 2023 which is increased by 40.8 percent from 2022. The largest package of this budget (15.8 billion USD) is allocated to R&D and testing.⁸³ It is worth mentioning that the budget announcements by countries which are made public are in addition to the “black budget” which is classified and is allocated to classified and covert military R&D operations, and command.⁸⁴

While the USSF is currently the only independent space force in the world, it was not the first. The first space force in the world was founded by Russia in 1992 and was an independent military operation until its merger with the Russian Air Force in 2015. Today, the Russian Aerospace Forces (VKS) is tasked with “air and space defense, communication systems, intelligence assets, electronic warfare, unmanned aerial vehicles, automatic weapon systems, military transport aviation, and personal protective equipment.” (Myers, 2018: 91) Russians were also among the forerunners of making and utilizing surveillance satellites in the world. The Soviet Union launched the *Zenit-2* photo-reconnaissance satellite in 1961 as part of a series of launches devoted to military missions such as radio intelligence gathering, radar intelligence, navigation and communication

⁸¹ For history and mission statement of the US Space Force, see: [United States Space Force official website: What's the Space Force](#)

⁸² For US Space Operation Command fact sheet and mission statement, see: [US Space Operation Command official website: About SPOC](#)

⁸³ For details of the budget, see: [Department of the Air Force President's Budget: 2023 budget overview](#)

⁸⁴ See: Loren Thompson, “The U.S. Air Force’s Latest Budget Is Shrouded In Secrecy”, *Forbes*. Feb 10, 2020. [The U.S. Air Force’s Latest Budget Is Shrouded In Secrecy](#) Steven Aftergood, “Bid to Rectify the “Black Budget” Fails”, *Federation of American Scientists*, July 26, 2018. [Bid to Rectify the “Black Budget” Fails](#) Phil Patton, “Exposing the Black Budget”, *Wired*. November 1, 1995. [Exposing the Black Budget](#)

systems and space-based early missile warning systems. By the end of 2021, the United States had around 230 military satellites in orbit, followed by Russia and China each with about 100.⁸⁵

Looking at the list of countries with the highest military spending worldwide in 2021 while also paying attention to recent developments and transformation of their space military operations, one could observe a very troubling trend towards an ‘armed and ready’ situation in outer space which could escalate by provocation.

⁸⁵ Data source: Union of Concerned Scientists: Satellite Database, In-depth details on the satellites currently orbiting Earth, including their country of origin, purpose, and other operational details. See: [UCS Satellite Database](#)

Country	Military spending in 2021 (billion USD)	Major recent space force/command/unit formation and year of establishment
The United States	801	US Space Force – 2019
China	293	People's Liberation Army Strategic Support Force Space Systems Department – 2015
India	76.6	Defence Space Agency – 2018
The United Kingdom	68.4	United Kingdom Space Command – 2021
Russia	65.9	Russian Aerospace Forces – 2015
France	56.6	Space Operations Squadron – 2020
Germany	56	Bundeswehr Space Command – 2021
Saudi Arabia	55.6	Saudi Space Commission – 2018
Japan	54.1	Space Operations Squadron – 2020
South Korea	50.2	South Korea Air Force Space Operation Center – 2021
Italy	32	Space Operations Command - 2020

Table 1. Information on military spendings from [Statista - Countries with the highest military spending](#), information on space force/command/unit formation and year of establishment from respective websites

The list of countries with space military capabilities is longer and the numbers are increasing annually as more states develop their aerospace industries. These developments come at a time when according to *Government Space Programs* report, by the consulting firm *Euroconsult*, the total global government space budget had an eight percent increase in 2021 compared to 2020, with numbers totalling some 92 billion USD. The report further notes that 53 billion USD of that total budget was allocated to civilian activities and 39 billion USD went to the military. However, the report adds that the military share of the budget is increasing.

“Geopolitical tensions, increasing rivalry between leading space powers, and the value of space as the ultimate high ground drive the militarization of space trend, with leaders increasing their investments in defense space assets and technologies.”⁸⁶

Furthermore, according to a new report published by Stockholm International Peace Research Institute (SIPRI), world military spending reached an all-time high of 2.1 trillion USD in 2021 which was the seventh consecutive year that global military spending increased. Notable from the report is the fact that the US budget for military R&D rose by 24 percent between 2012 and 2021 which shows an increasing interest in developing ‘next-generation’ military technology by the US. The world’s second largest military spender, China, has also had a growing military budget for 27 consecutive years.⁸⁷ Another SIPRI report shows that sales of arms and military services by the world’s 25 largest companies totalled 361 billion USD in 2019. Five American companies topped

⁸⁶ For a summary of the report, see: : [Euroconsult: Government space budgets driven by space exploration and militarization hit record \\$92 billion investment in 2021 despite covid, with \\$1 trillion forecast over the decade](#)

⁸⁷ For the full report, see: [SIPRI: World military expenditure passes \\$2 trillion for first time](#)

the list: Lockheed Martin, Boeing, Northrop Grumman, Raytheon, and General Dynamics which together had a revenue of 166 billion USD in annual arms sales.⁸⁸

Expenditure on R&D and next-generation weapons systems is particularly alarming and relevant to the discussions on weaponization of Earth orbits. Weapons can be located in space or on the ground where they could be used to fire upon targets in both domains. Such weapons include anti-satellite (ASAT) missiles with kinetic kill vehicles which destroy satellites by physically colliding with them at high speed. The United States, Russia, India, and China have so far successfully tested ASATs by targeting their own satellites in orbit. These ground-based weapons not only threaten objects in Earth orbits but also pose an overwhelming environmental threat by creating massive space debris clouds following the destruction of the target. For instance, China tested its first anti-satellite missile in 2007.⁸⁹ As a result of the test, 2,317 pieces of space debris were released which were big enough to be tracked by NASA's Orbital Debris Program Office. In total, one anti-satellite missile test released around 35,000 larger than 1 cm pieces of debris in the orbit.⁹⁰ The issue of space debris will be discussed in the next segment of this chapter.

Other known types of space weapons include but are not limited to missiles with conventional warheads, directed energy weapons such as lasers or "Rods from God" which is an American proposed weapon system under Project Thor which would see tungsten rods dropped from the orbit, at 10 times the speed of sound, to strike bunkers and underground facilities on the ground.⁹¹

⁸⁸ For the full report, see: [SIPRI: Global arms industry: Sales by the top 25 companies up 8.5 per cent](#)

For details on global arms transfer, see: [SIPRI Arms Transfers Database](#)

⁸⁹ William J. Broad and David E. Sanger, "China Tests Anti-Satellite Weapon, Unnerving U.S." *The New York Times*, January 18, 2007. <https://www.nytimes.com/2007/01/18/world/asia/18cnd-china.html>

⁹⁰ Center for Space Standards and Innovations, "Chinese ASAT Test", December 5, 2007. <http://www.centerforspace.com/asat/>

⁹¹ See: Military Watch Magazine [Project Thor: What America's 'Rods from God' Space Based Superweapon Can Do](#), Space Daily [US Project Thor would fire tungsten poles at targets from outer space](#)

None of these activities are technically prohibited by the OST or are against the spirit of “peaceful purposes” since the treaty only bans the use of “any objects carrying nuclear weapons or any other kinds of weapons of mass destruction” in Earth orbits. Moreover, the phrase “peaceful purposes” for activities in outer space in the OST does not even apply to Earth orbits since it is clearly stated that: “The Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden.” It is not surprising that several interpretations have been made ranging from total anti-militarization to non-aggressive purposes (the alleged US approach) or anti-weaponization in outer space.

By using the linguistically fluid phrase “peaceful purposes”, the elites exert their power or rather abuse their power of influence, access, and capital, to create conditioned “knowledge” in which the ongoing active militarization and weaponization of Earth orbits is either absent or is disguised as a defensive right for ensuring national security. Activities in outer space are represented as dedicated to peaceful purposes and any other ‘unpeaceful’ uses of Earth orbits are depicted as essential for ensuring national security. Therefore, the elites manipulate the public in order to hide or justify their dramatically increasing military spendings and interventions.

In addition, information that could lead to “specific” knowledge (e.g., the real cost of military activities in outer space compared to civilian ones and the knowledge of those activities, strategies to maintain the military budget at high levels, relevant details of the R&D projects and the weapons systems, high-value contracts between the military and aerospace industry) are generally not easily acquired by the general public or are only partially offered.

Creating and controlling such knowledge produces a manipulated socially shared false understanding of the current civilian and military duality of human activities in Earth orbits among the general public. Understanding is not simply connecting meanings to words but is constructing the mental models associated with the discourses. Thus, when understanding is intentionally impaired, so are the mental models which are the foundation of further learning and social action which lead to the formation of further knowledge, attitudes, and ideologies.

“Restricting the freedom of understanding causes the recipients of the discourse to believe that the reality of the conditions is as presented to them and are in their interests whereas in fact they are in the interest of the manipulators and their associates.” (van Dijk, 2006: 370)

This manipulation of social cognition also impacts the values, expectations, and actions of the recipients in a way that they could become unable to recognize the real intentions or the consequences of the actions of the elites since they also lack the specific knowledge to be used to resist the manipulation in the first place. This is how resistance to the manipulating discourses about militarization and weaponization of Earth orbits become difficult since it would be labeled as ‘unpatriotic’. The hegemonical normalization of this discourse began in the early days of the Space Race (as shown in the previous chapter) and is currently evident even in the smallest details such as the name of the UN Committee on the **Peaceful Uses of Outer Space** -, the title of the guidelines - Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the **Peaceful Uses of Outer Space**, or the definition of space sustainability as mentioned earlier.

It is worth mentioning a third addition to the elites in this regard: universities. Universities are becoming more engaged with the military and aerospace industrial complex as several projects are being funded by those entities to further science, engineering, and data analysis capabilities and to identify new talents. For example, the Defense Advanced Research Projects Agency (DARPA) of US Department of Defense, in a recent conference series named *DARPA Forwards, Advancing the Horizons of National Security* is “partnering with six of the nation’s leading research and development universities to connect with new communities of talent.”⁹² While this has been of concern, further discussion in this regard is beyond the scope of this project, but could be investigated in future research.

2.5 Equitable access and in the interest of all humankind

The second important concept which has been repeatedly used for outlining the basis of human activities in outer space is “equitable access” which is also expounded by indicating that such activities should be “in the interest of all humankind”.

Once again, reference must be made to the Outer Space Treaty (OST) which serves as the foundation for the LTS Guidelines. According to Article I of the OST, exploration, and use of outer space “shall be carried out for the benefit and **in the interests of all countries**, irrespective of their degree of economic or scientific development, and shall be **the province of all mankind**.” It is further added that all states shall be free to explore and use outer space “**without discrimination of any kind**” and “**on the basis of equality**”. These assertions are also relevant to Article II indicating that **no national appropriation** or sovereignty can be claimed in outer space

⁹² See: [DARPA Forward Event Series, Summer/Fall 2022](#), Kathy Barker, “What is the influence of the military and military funding on your campus?” *Scientists as Citizens*, November 1, 2019. [What is the influence of the military and military funding on your campus?](#), Kistiakowsky, Vera. “Military Funding of University Research.” *The Annals of the American Academy of Political and Social Science* 502 (1989): 141–54. <http://www.jstor.org/stable/1046982>

and Article X according to which, activities in outer space shall be guided by **the principle of cooperation and mutual assistance**.

Therefore, the discourse of the OST and subsequently that of the LTS guidelines explicitly endorses ‘fair’ and ‘responsible’ uses of outer space. It is important to revisit the two terms before investigating the interconnectedness of the discourse and the current conditions as well as the projections of the future conditions of Earth orbits in that regard. Wolfgang Rathgeber (2010) associates the concept of fairness in outer space to that of justice, noting that the two terms generally imply allocating of goods or opportunities in a way that all involved parties get their due share. He further applies the concept of fairness and justice to both the processes and to distributions.

“Regarding processes, fairness and justice refer to institutions, mechanisms, and policies. As for distributions, fairness and justice are concerned with the amounts, quotas, and ratios to be allocated.” (Rathgeber, 2010: 1)

Ray A. Williamson (2010) narrows down the definition, saying that when applied to outer space activities, “fairness” indicates that states with advanced technological resources shall access and use outer space in a manner that would not hinder the opportunities of less advanced nations in carrying out activities in outer space. Williamson also expands on the concept of “responsibility” in the context of outer space operations, stating that responsible behaviour means states shall act in a way that their activities do not impede the long-term continuation of such activities in outer space.

It is hardly possible to attribute the ideas of fairness and responsibility to the current conditions of space community and activities in Earth orbits due to the fact that those conditions are marked by

a “first come, first served” attitude and are deeply divided with unequal opportunities, technical capabilities, and capacities.

Earth orbits have been treated by developed nations as an open territory which is open to exploitation for anyone who has the means to do so. Williamson (2010:12) explains these tendencies of the developed states as “do what you want in outer space; just stay out of my way”. Using the metaphor of ‘frontier’ or ‘the Wild West’ to refer to outer space is a major contributor to these conditions and has created an atmosphere of justification and manifest destiny for such behaviour.

The world has witnessed noticeable changes in outer space activities in the past two decades. Even though according to United Nation Office for Outer Space Affairs (UNOOSA) there were 41 national and three regional space agencies on its list of worldwide space agencies by the end of 2021⁹³, most outer space activities have been carried out by three major powers in the space community which are the United States, Russia, and China. Today, only ten countries (the United States, Russia, China, Japan, India, Israel, Iran, Ukraine, North Korea and South Korea) and one intergovernmental entity (the European Space Agency) in the world have launch capabilities.⁹⁴ Unsurprisingly, the same top three states have created the highest amount of debris in Earth orbits.⁹⁵ ESA Space Debris Office estimates some 36,500 greater than 10 cm, more than 1 million greater than 1 cm and some 130 million greater than 1 mm to 1 cm debris objects are currently

⁹³ UNOOSA: World Space Agencies, <https://www.unoosa.org/oosa/en/ourwork/space-agencies.html> accessed on Nov 9, 2021

⁹⁴ South Korea was the most recent addition to the list of countries with launch capabilities with the successful launch of their first locally made rocket, Nuri on June 21, 2022. For the details of the launch, see: Choe Sang-Hun, “South Korea Launches Satellite with Its Own Rocket for the First Time”, *New York Times*, June 21, 2022. [South Korea Launches Satellite With Its Own Rocket for the First Time](#)

⁹⁵ For detailed infographics, see: Dave Mosher and Samantha Lee, “More than 14,000 hunks of dangerous space junk are hurtling around Earth — here's who put it all up there”, *Business Insider*, March 29, 2018. [More than 14,000 hunks of dangerous space junk are hurtling around Earth.](#)

present in Earth orbits.⁹⁶ According to Pelton (2013) the net growth of debris population only in the Low Earth Orbit (LEO), home to most satellite mega-constellations, is at an average rate of 5 percent per year. ESA Space Debris Office reports the number of satellites ever placed in orbit (by May 2022) at about 13100, 8410 of which are still in Earth orbits and only 5800 of which are still functional.⁹⁷

The numbers are growing steadily due to the addition of satellite mega-constellations which are also owned by companies belonging to world space power. The American SpaceX has more than 2200 (by May 2022)⁹⁸ satellites in orbit and could eventually launch more than 40,000. The United Kingdom's OneWeb is planning to launch 648 satellites for its constellation, almost half of which have been launched already.⁹⁹ Amazon's Kuiper megaconstellation will also eventually include 3200 satellites.¹⁰⁰ Canadian Telesat is also working on a 188-satellite constellation named Lightspeed to debut in 2026.¹⁰¹ Considering the number of applications filed by satellite operators to licensing authorities, Pardini and Anselmo (2021) predict more than 100,000 new spacecraft to be launched in orbit by 2030. In a most recent case, American company Astra filed a licensing application with the United States Federal Communications Commission (FCC) for a 13,600-satellite broadband megaconstellation.

In Recent years, targeting of satellites by surface-launched anti-satellite missiles (ASAT) has also greatly contributed to the increase of space debris in Earth orbits. For instance, according to ESA

⁹⁶ ESA Space debris by the numbers https://www.esa.int/Safety_Security/Space_Debris/Space_debris_by_the_numbers

⁹⁷ ESA Space debris by the numbers https://www.esa.int/Safety_Security/Space_Debris/Space_debris_by_the_numbers

⁹⁸ For recent details of the launches, See: Stephen Clark, "SpaceX passes 2,500 satellites launched for Starlink internet network" *Spaceflight Now*, May 13, 2022 [SpaceX passes 2,500 satellites launched for Starlink internet network](#)

⁹⁹ For details of the most recent launches, see: OneWeb Press Release of February 10, 2022. [OneWeb Confirms Successful Launch of 34 Satellites, Delivering Ongoing Momentum at the Start of 2022](#)

¹⁰⁰ For recent developments of Amazon's Kuiper project, see: "Amazon makes historic launch investment to advance Project Kuiper" *Amazon News* [Amazon makes historic launch investment to advance Project Kuiper](#)

¹⁰¹ "Telesat to order 100 fewer satellites for LEO constellation" *Reuters*, May 6, 2022. [Telesat to order 100 fewer satellites for LEO constellation](#)

Space Debris Office, the 2007 China test of an ASAT alone increased the number of trackable debris objects by 25 percent. In a more recent case, on November 15, 2021, Russia tested an ASAT causing a debris field which raised the collision alarms on the International Space Station for several hours.¹⁰²

The most alarming concern regarding space debris and traffic of objects in Earth orbits is the “Kessler Syndrome”. In a 1978 paper, scientists Donald Kessler and Burton Cour-Palais alerted the space community to continuous satellite collisions as more were being launched into orbits.

"Satellite collisions would produce orbiting fragments, each of which would increase the probability of further collisions, leading to the growth of a belt of debris around the Earth."
(Kessler and Cour-Palais, 1978, 2637)

The study warned that a cascade of debris in Earth orbits could get out of control and potentially make Earth orbits unusable. In a more recent interview in 2012, Kessler clarified that the effect is not a sudden and one time incident but “as continuous and as already started, where each collision or explosion in orbit slowly results in an increase in the frequency of future collisions.”¹⁰³

Developed wealthy nations are leaving tons of space debris behind and are also steadily increasing the traffic of objects in Earth orbits, both of which could potentially make Earth orbits practically unusable in time. Developing nations, those who are working relative to their current capacities and wealth to join the spacefaring club, will be faced with a congested or rather unusable orbital environment if the current conditions are not reversed. Such a collapse in Earth orbits will not

¹⁰² NASA Administrator Statement on Russian ASAT Test <https://www.nasa.gov/press-release/nasa-administrator-statement-on-russian-asat-test/> accessed on Nov 16, 2021

¹⁰³ For the full article, see: Andrea Gini “Don Kessler on Envisat and the Kessler Syndrome” *Space Safety Magazine*, April 25, 2012. [Don Kessler on Envisat and the Kessler Syndrome](#)

solely affect developing spacefaring nations but will rather have devastating impacts on the whole of the human civilization on Earth since life on the planet depends deeply on the functioning of satellites whether for the data they provide or for their undeniable role in climate and disaster management.

A 2020 study showed that despite current measures, debris population in higher altitudes of LEO grows at an accelerating rate and that increase will ultimately lead to a higher density of objects and therefore higher collision rate. (As shown by the figures below)

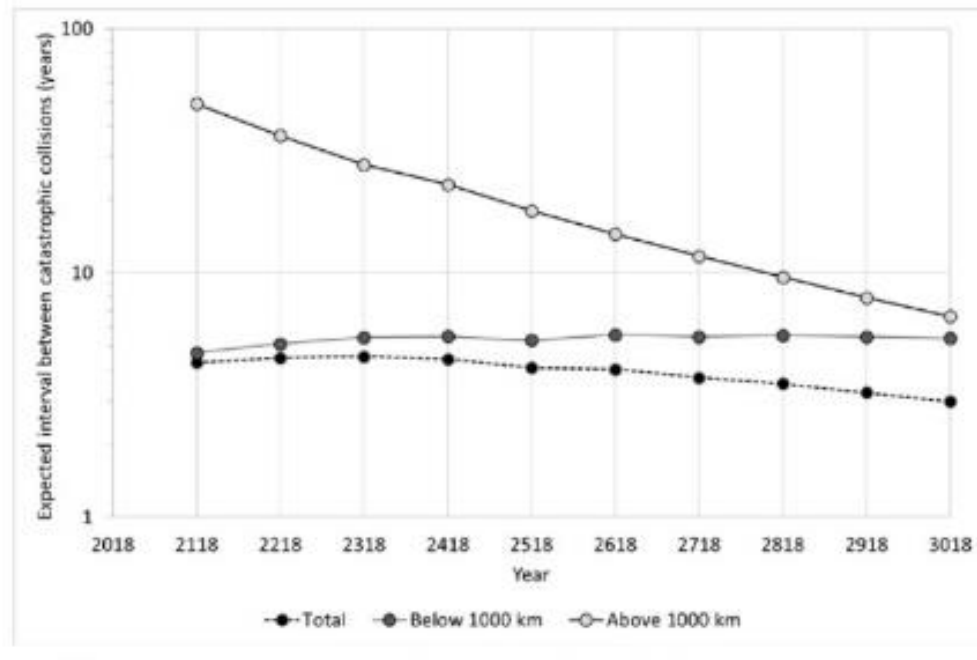


Figure 7. Expected intervals between catastrophic collisions in LEO calculated at the beginning of each century of the projected period – from Hugh G. Lewis, “*Understanding long-term orbital debris population dynamics*” (2020)

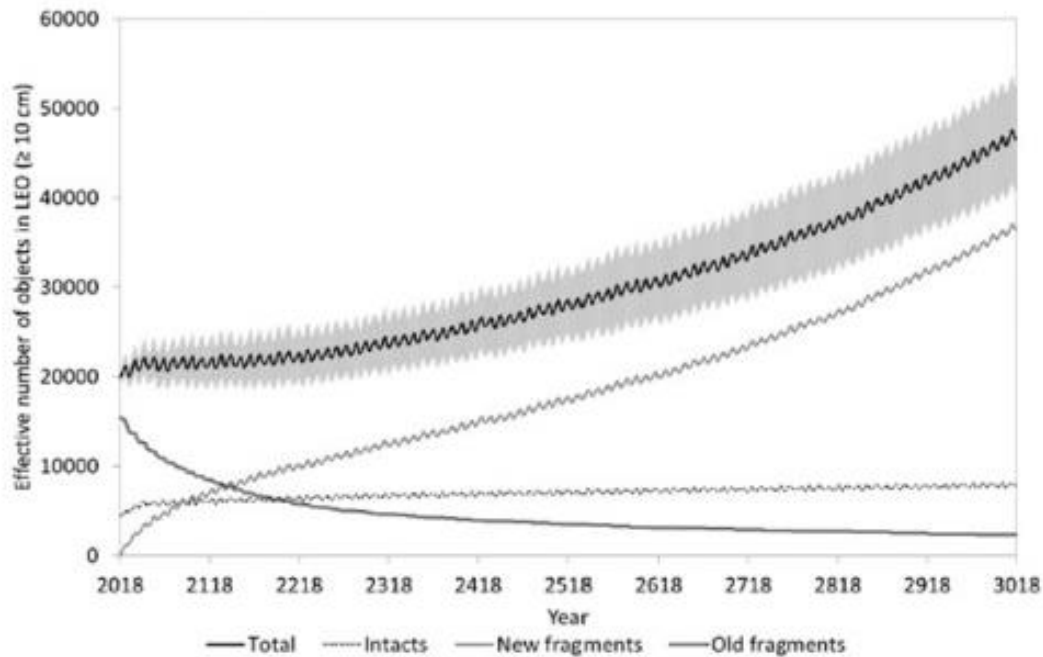


Figure 8. Growth of future trackable object population in LEO over a 1000-year projection period – from Hugh G. Lewis, “Understanding long-term orbital debris population dynamics” (2020)¹⁰⁴

If we consider “responsibility” in relation to having more “power” in the form of capabilities such as technological development, economic wealth, and technical knowledge, it would be logical to expect more “responsible” behaviour from the more “powerful” nations in outer space. However, it seems that the same “power” creates a shroud of ignorance behind which is economic profit (to be discussed in the next segment), geopolitical superiority (as discussed in the previous segments), monopolization of knowledge and striving for distinction and individualism which are enabled and contained by the implicitly propagandizing and ineffective discourse of the OST and subsequently the LTS guidelines. Walter McDougall (1985) quotes the US Ambassador to the United Nations during the OST negotiations, Arthur Joseph Goldberg as saying that “the province of all mankind”

¹⁰⁴ For full article, see: Hugh G. Lewis, “Understanding long-term orbital debris population dynamics”, *Journal of Space Safety Engineering*, Volume 7, Issue 3, 2020. Pages 164-170, ISSN 2468-8967, <https://doi.org/10.1016/j.jsse.2020.06.006>.

was meant as a sort of "freedom of the seas" clause, no more." (McDougall, 1985: 418)

A more troubling issue is that the "powerful" space actors have not been willing to agree to the most recent binding principles that would affect their favourable status in outer space. All that has been developed since then, is in the form of "soft law" and best practices whose existence is better than their absence but are not enough to keep pace with the levels of irresponsible behaviour of elites in Earth orbits. For instance, one of the main reasons behind the United States' refusal to sign the Moon Treaty (the last international binding mechanism for governing outer space activities) was Article XI declaring the Moon and its natural resources as "the common heritage of mankind". The United States objected to the article saying it would not be in accordance with the "free enterprise system" and could negatively impact the country's future commercial exploitation of the Moon resources. (Griffin, 1981: 750)

Fairness and responsibility are not only relevant to the future of developing nations in the space sector but also concern humanity as a collective on planet Earth. It is undeniable that satellite constellations have changed lives for the better and everyday operations of the planet are highly dependent on their operations. However, the chaotic and unregulated launch of satellite megaconstellations have caused several issues which go beyond environmental effects. Another issue which has emerged following the launch of mega-constellations is losing the dark and quiet skies.

It is common to think of satellites as cameras looking back at Earth from higher altitudes, aiding human civilization in numerous ways. However, looking up at the skies has also been an integral part of humankind's scientific, cultural, and spiritual development through history. Today, satellite

constellations have become a “mega-crisis of astronomy”¹⁰⁵ or end to dark sky or radio quiet zones¹⁰⁶. These criticisms have been raised by astronomers, telescope operators, radio astronomers as well as amateur sky observers.¹⁰⁷ Satellite constellations have created long trails of light in the sky which have hindered the view of observers who observe the skies from the ground. Satellite networks also create radio frequency pollution and interference especially for radio telescopes which are usually located in remote areas distant from sources of radio pollution. With satellites covering every corner of the sky, the right to dark and quiet skies is also disappearing.

A recent NASA *Astronomy Picture of the Day* (APOD) on June 14, 2022, shows the expanding scope of this issue. The streaks of light shown in the picture were created by LEO satellites reflecting sunlight and were captured in less than 2 hours and then merged into one frame.¹⁰⁸

¹⁰⁵ Ethan Siegel “Astronomy Faces a Mega-Crisis as Satellite Mega-Constellations Loom”, *Forbes*, January 19, 2021. [Astronomy Faces A Mega-Crisis As Satellite Mega-Constellations Loom](#)

¹⁰⁶ Daniel Clery, “Starlink already threatens optical astronomy. Now, radio astronomers are worried”, *Science.org*, 9 October 2020. [Starlink already threatens optical astronomy. Now, radio astronomers are worried](#)

¹⁰⁷ For a study of the impact of satellite megaconstellation on ground astronomy, see: Constance Walker, Jeffrey Hall, Lori Allen, Richard Green, Patrick Seitzer, Tony Tyson, ... Yoachim, P. (2020). Impact of Satellite Constellations on Optical Astronomy and Recommendations Toward Mitigations. *Bulletin of the AAS*, 52(2). <https://doi.org/10.3847/25c2cfcb.346793b8> Also, see: Ramin Shakiba, “Astronomers Want to Save Dark Skies from Satellite Swarms”, *Wired*. February 7, 2022. [Astronomers Want to Save Dark Skies from Satellite Swarms](#) Alexandra Witze, “‘Unsustainable’: how satellite swarms pose a rising threat to astronomy”, *Nature*. May 26, 2022. <https://doi.org/10.1038/d41586-022-01420-9>

¹⁰⁸ For the image and the description, see: [APOD Satellites Behind Pinnacles](#)



Figure 9. Astronomy Picture of the Day (APOD), NASA: Satellites Behind Pinnacles, posted on June 14, 2022

As shown by the examples and with reference to the two concepts of “fairness” and “responsibility” in outer space, one can observe clearly how the relevant discourse of the OST and subsequently the LTS guidelines is not only enabling the technologically and financially privileged states but are also providing them with a veil of protection for furthering their dominance over Earth orbits. One of the strategies used for manipulating the socially shared knowledge is the use of generalized, explicitly precise but implicitly vague discursive structures (van Dijk, 2006: 370, 373) such as the ones we observed in this segment. Those discursive tools have been used by elites in the space sector to contain their apathy towards the rest of the space community as well as the human collective on Earth. This had led to their dominance over Earth orbits without consideration

for preserving or even sharing the environment, while hindering the efforts by the rest of the community in that regard by enforcing their superiority through that dominance. This dominance leads to “inequality” which is the “structural result of historical processes of social, political and cultural group dominance.” (van Dijk, 1994: 23)

Is ‘inequality’ not in opposition to the discourse of the OST and the LTS guidelines? The obvious answer of “Yes” to this question is another witness to the oversimplified and transcendently ‘propagandizing’ nature of the discourse in the favour of the space elite, enabling them to continue the legitimization of their dominance through their material (technological capabilities) and immaterial (wealth, geopolitical status, and knowledge) power resources.

Perhaps a better image for the cover of the LTS guidelines would be a September 2020 projection by the ESA Space Debris Office of the future conditions of space debris in Earth orbits with the current increasing rates.¹⁰⁹

¹⁰⁹ For complete ESA analysis and predictions, see: [ESA: Space Debris Analysis and prediction](#)

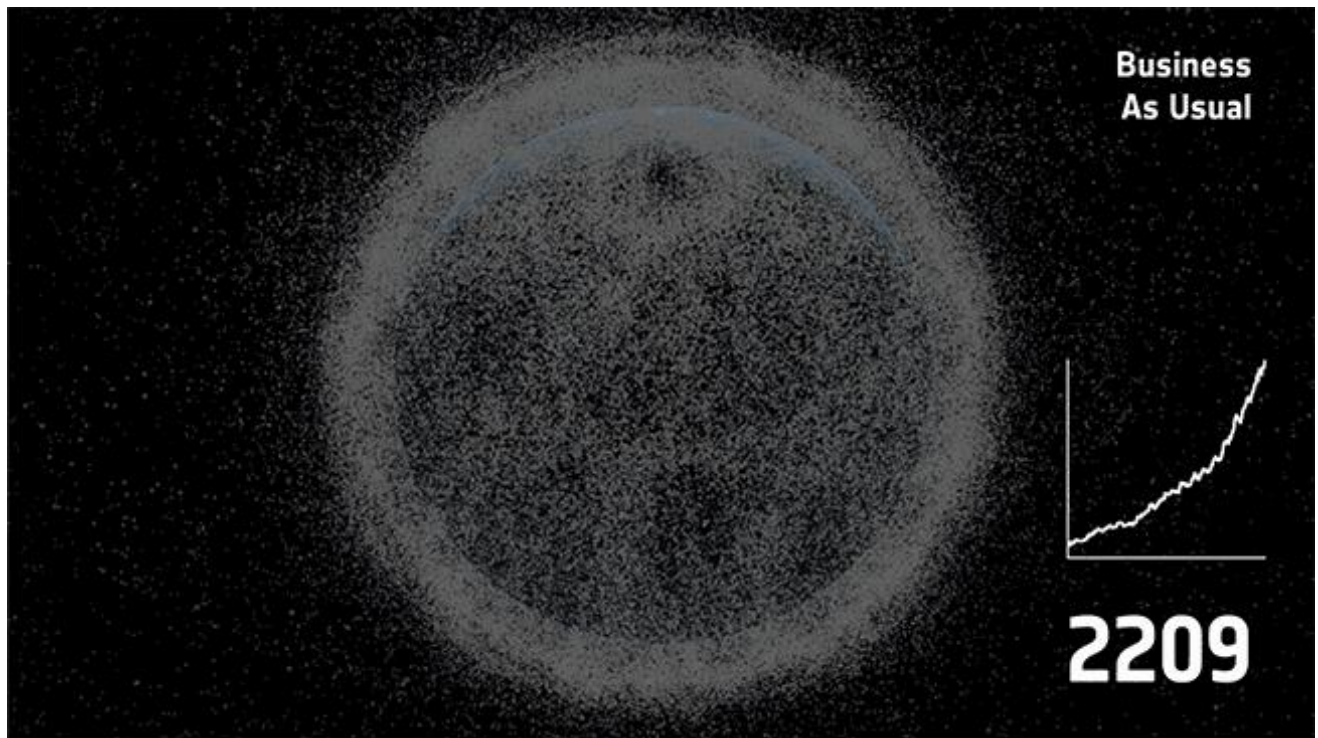


Figure 10. ESA: Space Debris Analysis and prediction, projections for the future of space debris congestion in Earth orbits in 2209

2.6 A finite resource for indefinite activities

While discussions about human activities in Earth orbits combine technological, social, cultural, geopolitical, environmental, and economic dimensions, the underlying core of the LTS guidelines is defined by an attitude of neo-liberal capitalism which reduces Earth orbits to a “resource” and promotes their continuous commodification and exploitation. This approach is reflected in the rhetoric of the guidelines and is deeply rooted in discursive elements such as absences and assumptions that have shaped the foundations of those guidelines.

The opening sentence of the LTS guidelines sets the foundation for a resource-centered and consumer-oriented attitude by saying: “The Earth’s orbital space environment constitutes a **finite**

resource that is being used by an increasing number of States, international intergovernmental organizations and non-governmental entities.” Taking into consideration the finitude of that “resource”, sustainability is then defined as “an ability to maintain the conduct of space activities **indefinitely into the future**” in a manner that “addresses the basic need to ensure that the environment in outer space **remains suitable** for exploration and use by **current and future generations.**”

At the dawn of the space age, the world powers’ involvement in outer space aimed to set records to ensure their geopolitical superiority. Today, that focus is shifting more towards economic gain, making outer space a medium for the growing space industry to exploit. While several technological aspects of the space industry are still immature, space business has already become well-established, and it is for the most part dependent on satellite industry. Satellites have been providing the world with data and connectivity throughout the years and dependency on the services they provide is increasing in parallel with the steadily growing technological capacities and need for global connectivity. According to the *State of the Satellite Industry Report* by Satellite Industry Association in 2021, the global space economy had a total revenue of some 386 billion USD in 2021, 72 percent of which belonged to the satellite industry. The 279 billion USD revenue of satellite industry included satellite services, ground equipment, satellite manufacturing and launch vehicle industry.¹¹⁰ In addition, the second edition of *Global Space Economy* by Northern Sky Research, anticipates 1.25 trillion USD in cumulative revenue by the space industry by 2030, over 570 billion USD of which will be produced by the satellite and space infrastructure market.¹¹¹

¹¹⁰ To view the SIA Executive Summary of the 2022 Report, see: [SIA State of the Satellite Industry Report - 2022](#)

¹¹¹ For complete report, see: [NSR Global Space Economy, 2nd Edition \(NGSE2\)](#)

While these figures reflect some existing dimensions of human activities in outer space, an economic and profit-dominated discourse in an international guideline such as the LTS, reduces the whole of the efforts and steps needed to move towards a more responsible, ethical, and fair relationship with outer space environment to economic factors. This attitude has been bolstered by the historical rhetoric of space as a frontier (as discussed in Chapter 1), a medium for exploitation and a separate domain from the planet. Such suppositions and absences create an influential and hegemonic anthropocentric attitude and ideology that have given rise to a mindset of entitlement which is being used by the space political industrial elites to further commodify Earth orbital space in favour of geopolitical, military, and capitalist power of a few. Through this attitude, the elites also exert dominance and discrimination towards the biosphere by taking away its agency and interrelatedness to the planetary system.

The spirit of capitalism in the space sector is mainly rooted in the commercialization of outer space which is driven by private corporations that are in fierce competition for making profit from satellite and launch industry in the first place, followed by deep space travel, space tourism and asteroid mining. These NewSpace¹¹² elites have access to private capital and are changing the paradigms of space industry by their anti-regulation attitude and self-serving organizational policies; thereby changing both the economic and political paradigms of the industry. A recent example of this approach is the appearance of a clause in the Terms of Service of Starlink broadband services provided via a mega-constellation of satellites belonging to Elon Musk's SpaceX. The clause declares that "For services provided on Mars, or in transit to Mars via Starship or other colonisation spacecraft, the parties recognise Mars as a free planet and that

¹¹² For an introduction on the term, see: [SatSearch: Let's talk about NewSpace](#)

no Earth-based government has authority or sovereignty over Martian activities.” Therefore, the terms indicate that any dispute will be settled via “self-regulating principles”.¹¹³

This commercial and consumer-oriented approach towards outer space is not unsupported by world governments. For example, the United States as the host of major global private space enterprises including SpaceX, Blue Origin, Virgin Galactic, Sierra Nevada, and Boeing has reiterated its support for commercial space industry by introducing the American Space Commerce Free Enterprise Acts of 2017 and 2019 as well as by signing multi-billion-dollar contracts with those private companies for satellite, cargo and crew launches to Earth orbits and beyond. The American Space Commerce Free Enterprise Act declares that the United States “citizens and entities are free to explore and use space, including the utilization of outer space and resources contained therein, without conditions or limitations” and it calls on the Federal Government to “interpret and fulfill its international obligations to minimize regulations and limitations on the freedom of United States nongovernmental entities to explore and use space.” More importantly, the Act clearly states that “outer space shall not be considered a global commons.”¹¹⁴ This level of support by a world space power for its commercial sector is of utmost importance since according to Article VI of the OST, states are responsible for national activities in outer space “whether such activities are carried out by the governmental agencies or by the non-governmental entities” and Article I declares outer space as not subject “to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”

¹¹³ For the full text of Terms of Service, see: [Starlink Legal Terms of Service - Canada](#)
For the abovementioned clause, see: 11. Governing Law under STARLINK BUSINESS SERVICE TERMS [Starlink Business Service Terms](#)

¹¹⁴ For full text of the American Space Commerce Free Enterprise Act of 2019, see: [H.R.3610 - American Space Commerce Free Enterprise Act of 2019](#)

NewSpace are propagating the idea of a utopian free-market future in outer space which on the surface seems a global ideal but is rather to the benefit of the wealthy tycoons who hide their expansionist capitalist intentions behind the façade of a humanist rhetoric of neoliberalism. The commercial space sector and their discourses on sustainability will be explored in detail in the next chapter. Installation of mega-constellations of satellites in Earth orbits, production of launch vehicles, launching and positioning of satellites for global customers, space tourism flights (for wealthy customers who can afford mutli-thousand-dollar extravagant trips) and signing multi-billion-dollar contracts with governments for military and commercial cooperation in Earth orbits and on other celestial bodies have created space capitalists (Parker, 2009).

“Neil Armstrong’s famous statement will have to be reformulated: space will not be the site of ‘one giant leap for mankind’, but rather one giant leap for capitalistkind.” (Shammas and Holen, 2019: 2)

Taking into consideration the above arguments, it becomes clear that a consumer-oriented discourse in the LTS guidelines makes the guidelines weak since the “benefits” for the people of Earth do not compare with the capital being accumulated by the space capitalist elites. The phrase **“current and future generations”** mentioned in the definition, seems meaningless as the profiteering of space capitalists does not provide for the whole of the “current generation” and their consumerist capitalism has no consideration for preserving the environment for “future generations”.

With their increasing influence on the minds of the peoples of the planet via their apparent humanist attitude (more on this in the next segment), while accumulating capital and technical capabilities, space capitalists see outer space as a trillion-dollar market that will quench their thirst

for expansion and will deem the legacy of travelling into outer space for exploration and gaining insight extinct. This is in correlation with an attitude of entitlement towards outer space which is another reminder of a century long rhetoric of ‘frontier’ in outer space discourses which led to the creation of what Kenneth Boulding calls a “cowboy economy” marked by “illimitable plains and also associated with reckless, exploitative, romantic and violent behaviour.” (Boulding, 1966: 7) This approach is especially relevant to outer space environment due to its spatial characteristics which has formed the basis of the idea that there is “always some place else to go when things get too difficult either by reason of deterioration or social structure.” (Boulding, 1966: 1)

This frontier ideology has been so well engraved in the minds and emotions of especially Western societies that it has led to the formation of an image of outer space, separate from terrestrial environment, as the new frontier, the high frontier, or the final frontier.

For as long as humans managed to reach outer space, there have been arguments about the meaning of ‘outer space’ and where it begins, therefore, where the point of its separation from the planet is. The common belief in the space community puts the edge of space at the Karman Line which is an imaginary boundary 100 kilometers above sea level. According to the US National Oceanic & Atmospheric Administration (NOAA) of the National Environmental Satellite, Data, and Information Service (NESDIS), “once this 100 km line is crossed, the atmosphere becomes too thin to provide enough lift for conventional aircraft to maintain flight. At this altitude, a conventional plane would need to reach orbital velocity or risk falling back to Earth.”¹¹⁵ This distinction is of benefit for international legal matters since there is no official definition offered

¹¹⁵ For details of the definition, see: [NESDIS, NOAA: Where is space?](#)

for “outer space” in the OST and this customary agreement shows where national air space ends, but it also causes ignorance about the environmental and geopolitical conditions of Earth orbits.

With reference to the discussion on space debris in the previous segment, the attitude of separation has led to an idea of Earth orbits as ‘a backyard’ which is not necessarily part of Earth environment and is merely ‘used’ and is often considered as a ‘dump site’. Witness to this is the naming of the outermost orbits of Earth as “graveyard orbits”. The tens of thousands of satellites that are launched into orbit have definite life beyond which they do not function (this time span is 25 years after the completion of the satellite’s mission, meaning a defunct satellite could remain in its original orbit for 25 years before the operator has to dispose of it). So far, the space sector has been able to dispose of the non-functioning satellites by two methods. First, the satellite is slowed down until it falls back towards Earth and burns up during re-entry in Earth’s atmosphere. Second, the satellite is pushed into higher orbits where it will remain revolving the planet for hundreds of years. The “graveyard orbit” is some hundreds of kilometers higher than the last functioning orbit so that the “junk” would not interfere with the functioning satellites. As good as this sounds, at this moment there are no plans of action for dealing with the debris in graveyard orbits. As the designated name suggests, it is supposed to be a graveyard holding the remains of the machine for an indefinite time.

This dividing attitude is not solely limited to outer space and is extended to the environment on Earth in particular that of “Point Nemo” in the Pacific Ocean. “Spacecraft Cemetery”, also known as the Oceanic Pole of Inaccessibility, is located approximately 1700 miles off east of New Zealand and 2000 miles north of Antarctica. Space agencies have been dropping their larger space debris pieces such as spacecraft and larger rocket parts there. According to a 2019 study published in *California Western International Law Journal*, more than 263 pieces of space debris including

Russia's Mir space station, NASA's Skylab and three Russian Salyut military space stations have been dropped in the area since 1971. The International Space Station (ISS) will also be de-orbited in the spacecraft cemetery in 2030 when it reaches its end of life. Even though sinking of the space debris in Point Nemo is not against the international law and is in line with Space Debris Mitigation Guidelines, the researchers of the study argue that regardless of its remoteness, the South Pacific Ocean Uninhabited Area (SPOUA) hosts a diverse marine life with species such as sponges, sea stars, squids, octopi, whales, viperfish, fishes, crustaceans. Space debris splashdowns take place with no consideration for their harmful effects (kinetic, chemical, and radioactive) on the marine environment.

“Environmental harm per se is not considered by space law in any meaningful way, except when the space environment is under consideration or when environmental damages lead to injuries to persons or damages to property.” (De Lucia and Iavicoli, 2019: 387)

The capitalist economic assumptions and the entitled approach to environment are both the cause and the effect of a human-centered discourse which is marked by the absence of reference to the biosphere and nonhumans as integral to the whole organism of Earth and therefore to the humankind's relationship with terrestrial and outer space environment. Thus, outer space discourses such as the LTS guidelines fail to address the inherent Right of Nature to have protection in the same way that the humans and their enterprises do to preserve and flourish.

As the title of the LTS shows, the guidelines are meant to ensure the continuation of human activities in outer space. Looking back at the OST as the foundation of the global regulatory mechanism in outer space, we find only one article which has a direct connection to this argument. Article IX of the OST specifies that states must conduct their activities in outer space as to avoid “harmful contamination” of the celestial bodies as well as changes to the Earth environment by

“the introduction of extraterrestrial matter”. States are also urged to hold “appropriate international consultations” to avoid “harmful interference” with activities of other states in outer space. As per usual, no clarifying definitions are provided by the OST for “harmful contamination” and “harmful interference”. The “harmful contamination” clause’s concern with Earth environment is limited to protection against potential hazardous extraterrestrial matter carried by a spacecraft returning to Earth from outer space.

While the previous examples of discursive manipulation were through the formation of knowledge leading to domination and inequality, in the argument of this segment absences and metaphors and the fundamentally ideological values are the tools of manipulation. This form of manipulation is among the most subtle and hence successful types of manipulation since it is well embedded in the social cognition of recipients and is gradually acquired and reinforced through lifetime to the point that it can hardly be denied or ignored (e.g., outer space as a frontier, separate and anthropocentric domain). On the other hand, the manipulation is further exerted in support of the cowboy economy of space capitalists which has discreetly served as a basis for discrimination. (van Dijk, 2006: 372)

Chapter Three

3.1 Introduction

Looking at current headlines on outer space activities makes it clear that the age of commercial space flight is already upon us. The news of commercial space vehicle launches, satellite constellations, space tourism and deep space travel technology tests by the private sector are evidence of the fact that human activities in outer space are no longer a merely governmental enterprise. Civil and military markets are heavily dependent on space operations making outer space geopolitics and economy integral parts of international business and relations. Unlike the late 20th and the early 21st century when activities in outer space were exclusive to states and created international political prestige and military superiority; today private space flight vehicles and missions are in routine operation. Thus, the space industry is no longer characterized by an operational structure defined merely by states but is also identified by a proliferation of activities carried out by the NewSpace. The inclusion of NewSpace has introduced new power relations in the space industry and has transformed the paradigms of the industry via entrepreneurial business models, fast-growing innovation and technology, immense capital, and public relations.

Such transformations have been considered by some as gateways to democratization of outer space. Taylor (2020) considers reusable launch vehicles created by the private space sector, reducing the price of launches and the increasing number of NewSpace startups as how the privatization of outer space can create a more democratic access to outer space. Paat-Dahlstrom and Dahlstrom (2020) also consider the rise of commercial space startups and projects as democratizing since they enable actors beyond governments to take part in exploration of outer space. However, there are some challenges to this point of view. Undoubtedly, inclusion of private

sector in the space industry leads to competition. In the case of outer space, this competition revolves around reducing production and launch prices (of launch vehicles and infrastructure) and achieving results in a quicker manner. Two of the major setbacks of outer space operations have always been heavy costs and consequently slow progress of those operations. The private space sector has foregone those predicaments with its considerable capital and relative freedom from bounding regulations as the result of inadequate international regulating mechanisms for commercial space activities and immense support for commercial actors by their respective states. As Baiocchi and Welser IV (2015: 98) put it, building satellites, and launching space missions are much easier today than at the dawn of Space Age, therefore, “a new space race has begun and, in this one, nation-states are not the only participants”. This new space race does not happen separate from the usual mainstream governmental clench of power in outer space but introduces shifts to power relations some of which are not as apparent as others.

Classic definitions of spacepower have placed it in the hands of states. Lupton (1988:4) defines spacepower as “the ability of a nation to exploit the space environment in pursuit of national goals and purposes and includes the entire astronautical capabilities of the nation. A nation with such capabilities is termed a space power”. Jusell (1998) expands this definition to include “support of national security” as the goal of a nation’s pursuit of spacepower while Oberg (1999:10) believes spacepower gives a country strongarm ability to “politically influence the actions of other states and other kinds of players, or to otherwise achieve national goals through space activity.”

Definitions of spacepower began to change as the world entered the 21st century when space operations for civilian and military uses in Earth orbits witnessed a dramatic increase. Dolman (2001) offers a new perspective about spacepower saying “who controls low-earth orbit controls near-Earth space. Who controls near-Earth space dominates Terra. Who dominates Terra

determines the destiny of humankind.” (Dolman, 2001: 6) Pfaltzgraff (2011) defines spacepower as having the capability to carry out military operations in and from space and use outer space for civil and commercial purposes. Spacepower, therefore, extends the domain of international relations from “traditional horizontal geographical configuration of the Earth divided into land and the seas to include the vertical dimension that extends from airspace to outer space”. (Pfaltzgraff, 2011: 30) As definitions of spacepower develop, it is observed that focus on states as the only actors with spacepower is being shifted due to the involvement of NewSpace. This shift reflects the emphasis of Oberg (1999) that a proper theory of power in space must include the commercial aspects as “it will be the commercial manufacturers, owners, operators, and users who will contribute the larger, if less clearly perceptible, aspects of space power” (Oberg, 1999: 125)

Changing trends in the distribution of power and capabilities in outer space as the result of the involvement of the private space sector are generally accepted among experts and scholars inside and outside of the space industry to various degrees. However, current perspectives consider those changes to be rooted in the private space sector’s innovative technologies, lower-cost launch systems, production of smaller satellites, advanced computing systems, new business models, substantial investment capabilities or economic benefits. (Welser IV, 2016) (Taylor, 2020) (Baiocchi and Welser IV, 2015) (Sweeting, 2018) (Denis, et al., 2020) (Rementeria, 2022) (Whealan George, 2019)

While these points are relevant and of immense importance, they are not the only means by which the private space sector is transforming the space industry. There has always been a connection between major NewSpace actors and their respective national space entities and policies. For decades, private enterprises have operated under the direction of state policies and directives while states have been publicizing the achievements of private enterprises as their national triumphs and

sources of economic gain and profit. However, a new kind of NewSpace has emerged in the industry whose power of influence does not merely anchor in technological and economic arenas but rather extends into the realm of deep and fierce discursive influence and manipulation. This new kind of spacepower is being exerted by huge private aerospace companies such as SpaceX, Blue Origin and Virgin Galactic founded by multibillionaires. Led by the richest people on the planet, SpaceX and Blue Origin, as multifaceted enterprises and with their ‘celebrity’ founders Elon Musk and Jeff Bezos, not only have superior technological, financial, and innovative capabilities but are also tremendously involved in reaching out to the general public and their discursive influence has spread globally and intergenerationally. Both Musk and Bezos have achieved this discursive influence especially through their numerous discourses on sustainability. Musk and Bezos have been propagating new kinds of survivalism and futurism which directly target emotions, fears and hopes of the recipients.

Involvement of the private sector in the space industry is not limited to a specific country and is present in most of the established or rising nations in the industry. In addition, this involvement is not a very recent phenomenon and commercial actors have been active in the space sector for decades. However, commercial activities in outer space have been gaining more momentum and receiving more publicity in recent years due to successful launch of space tourism missions by the private sector, carrying out of commercial cargo and crewed missions for national space programs and influential discourses of certain private enterprises addressed to the general public via media, online platforms and social media. This chapter first provides a summary of the dynamics of the commercial space sector in the top three world space powers, the United States, China, and Russia followed by the analysis of the discourse of two major private aerospace companies involved in discussions about “sustainability”.

3.2 Private space sector: A short history

July 11 and 20 of 2021 were two days which reminded global audiences of the existence of commercial space tourism. On July 11, Richard Branson's Virgin Galactic's SpaceShipTwo aircraft made its first suborbital crewed flight¹¹⁶ followed by Jeff Bezos's Blue Origin's New Shepard aircraft which made its first flight of the same kind on July 20¹¹⁷. Both events were live streamed and received extensive media and social media coverage. It was further back in time, in 2012, when the private space sector became more widely recognized following the first successful launch and docking of cargo to the International Space Station (ISS) by commercial aerospace company, SpaceX.¹¹⁸ However, the space sector was privatized long before the successful docking of SpaceX's Dragon capsule to the ISS in 2012, even though that privatization had not received the same levels of publicity and media coverage.

The first commercial activity in outer space took place in 1962 with the launch of the first transatlantic communication satellite, Telstar 1, which was the result of collaboration between telecommunication company AT&T and NASA.¹¹⁹ The world's first commercial launch company, Arianespace, was founded in Europe in 1980 and has overseen launches for the European Space Agency (ESA) since then. The company is financed by European banks and aerospace industries¹²⁰ and its major shareholder has been ArianeGroup, a joint enterprise between the French Airbus and Safran companies¹²¹, which holds some 64 percent of the company's shares. The rest is owned by

¹¹⁶ Watch [Highlights From Richard Branson's Virgin Galactic Flight Into Space](#)

¹¹⁷ For details of the launch and the recorded launch sequence see: "Blue Origin safely launches four commercial astronauts to space and back" on Blue Origin official website. [Blue Origin safely launches four commercial astronauts to space and backabout:blank](#)

¹¹⁸ See: "First Private Craft Docks with Space Station" by Kenneth Chang for *The New York Times* on May 22, 2012. [First Private Craft Docks with Space Station](#)

¹¹⁹ For details of the launch and the mission, see: NASA History: "[July 12, 1962: The Day Information Went Global](#)"

¹²⁰ Oxford Dictionary of Space Exploration, 2018 via online, see: [Oxford Dictionary of Space Exploration - 2018 edition](#)

¹²¹ For full history and profile, see: [Ariane-Group: Company Profile](#)

other European companies from Germany, Italy, Belgium, Spain, Sweden, Netherlands, Norway, and Switzerland. The company reported a revenue of 1.25 billion euros in 2021 and has been offering launch services to a variety of customers using its Ariane V and Vega launch vehicles which are among the most reliable of their kind currently active in the field.¹²²

Since after Arianespace, numerous private companies around the world have been providing spaceflight services to international civilian and military customers. The list of those companies includes some of the most recognized names of the industry such as Boeing, Lockheed Martin, Northrop Grumman, Sierra Nevada, Bigelow Aerospace, Orbital Sciences Corp., United Launch Alliance, Thales Alenia Space, SpaceX and LuxSpace. Space tourism also was introduced to the space industry in 1996 when Iranian American billionaire entrepreneurs Anousheh Ansari and Amir Ansari funded a 10 million USD prize (Ansari X Prize) for a commercial company that could launch a reusable crewed spacecraft into space twice within two weeks. Virgin Galactic's SpaceShipOne won the prize in 2004.¹²³

Private companies have been working with governmental and inter-governmental space agencies for decades and contrary to widely held belief, these companies do not merely spend private funds. The private space sector has been dependent on contracts with their respective governments throughout the years. Such, often multi-million and multi-billion dollar, contracts have enabled the private sector to develop their capabilities and at the same time to get involved in significant governmental operations such as military and intelligence missions and international space projects such as the International Space Station or the upcoming multi-governmental Artemis Mission to take humans back to the Moon. For instance, in April 2021, NASA awarded a 2.9

¹²² For full history and details of the missions, revenue, and shareholders, see: [Company Profile: Arianespace.com](https://www.arianespace.com/en/about-us)

¹²³ For the history and the results of the competition, see: [XPrize: LAUNCHING A NEW SPACE INDUSTRY](https://www.xprize.org/launching-a-new-space-industry)

billion USD contract to SpaceX for the production of the Moon lander for the Artemis Program.¹²⁴ Led by NASA and in collaboration with international and commercial partners, the Artemis Program's goal is to send humans to the Moon and to establish the first long-term presence on the surface, leading to the next step which would be "sending the first astronauts to Mars".¹²⁵ NASA also awarded the production of boosters for the Space Launch System (SLS) super heavy rocket for the Artemis missions to Northrop Grumman in December 2021; the contract has a value of 3.19 billion USD.¹²⁶

These are only two among tens of similar contracts with international private companies taking part in the production of different components of the Artemis Program. As shown by these examples, while the word 'commercial' implies that the projects are being developed at the expense of private companies, multi-million-dollar and multi-billion-dollar contracts with governmental space agencies means that such projects are in reality hugely supported by taxpayer money. While North American and European private aerospace companies have been more visible to the eyes of the general public in recent years, they are not the only private enterprises active in the space industry.

3.3 Private space sector in the top three space powers

In the past decade, China has successfully claimed a position among the top world powers in outer space. The country's complex and fast developing space industry has proven to be not only

¹²⁴ See: NASA Press Release 21-042 on April 16, 2021, [As Artemis Moves Forward, NASA Picks SpaceX to Land Next Americans on Moon](#)

¹²⁵ Artemis Accords, which has been based on the Outer Space Treaty of 1967, were written to set the roadmap for the project and have been so far signed by Australia, Bahrain, Brazil, Canada, Colombia, France, Israel, Italy, Japan, the Republic of Korea, Luxembourg, Mexico, New Zealand, Poland, Romania, Saudi Arabia, Singapore, Ukraine, the United Arab Emirates, the United Kingdom, and the United States. For further information about the project, see: [NASA Artemis Missions](#) For Artemis Accords, see: [NASA: Artemis Accords](#)

¹²⁶ See: NASA Press Release 21-160 on December 2, 2021, [NASA Awards Artemis Contract for Future Mega Moon Rocket Boosters](#)

efficient but also vigorous. While the country joined the spacefaring nations relatively later, their first successful satellite launch having been Dong Fang Hong I in April 1970¹²⁷, its space program has been accelerating tremendously, putting the country among the top three powers in outer space alongside the United States and Russia.

On October 15, 2003, China became the third country, after Russia and the United States, to carry out crewed space flight independently.¹²⁸ In 2013, the Chinese Moon lander Chang'e 3 touched surface and made China the third country to perform a soft lunar landing after Russia and the United States.¹²⁹ The country achieved the highest number of orbital launches in a year in history with 34 percent of global launches in 2018.¹³⁰ The following year saw China becoming the first country to have ever landed on the far side of the Moon.¹³¹ In May 2021, China's successful Tianwen-1 mission once again made the country the third after the United States and Russia to have landed a probe on the surface of Mars and established communication back to Earth.¹³² Currently, China is working on the construction of its first permanent space station *Tiangong* in Low Earth Orbit which is scheduled to become fully operational by 2023.¹³³

¹²⁷ For an introduction and the launch video, see: [70. On 1970/4/24, Dongfanghong 1, Carried on a Long March 1 Rocket was Successfully launched](#) via VideoChinaTV channel on You Tube, dated February 12, 2021

¹²⁸ See: Tony Long, “Oct. 15, 2003: China Joins the Fraternity of Space Travelers” for *Wired*, dated October 15, 2007

¹²⁹ For a detailed profile of the mission, see: [Chang'e 3: NASA Science](#) via NASA Science, Solar System Exploration, dated January 26, 2018

¹³⁰ See: Joan Johnson-Freese, “China launched more rockets into orbit in 2018 than any other country” for *MIT Technology Review*, dated December 19, 2018

¹³¹ For an analysis on the importance of the mission, see: Eric Berger “Here's why China's launch to the far side of the Moon is a big deal” for *Arstechnica*, dated December 10, 2018

¹³² For a detailed profile of the mission, see: “[Tianwen-1 and Zhurong, China's Mars orbiter and rover](#)”[about:blank](#) via *The Planetary Society*

¹³³ For a virtual tour of the space station, see: Eleanor Lutz [A Tour of China's Future Tiangong Space Station](#)“<https://www.planetary.org/space-missions/tianwen-1>” for *The New York Times*, dated September 22, 2021

This rapid evolution of China’s space program in the twenty-first century has become a “great leap forward” (Harvey, 2013) which has become an important and visible part of the country’s attempt to demonstrate domestic manufacturing and launch capabilities in outer space.

This comes as China’s space program is often excluded from the broader international cooperation scene for outer space activities such as the International Space Station (ISS) and more recently the Artemis Program. China’s absence from these projects is due to the United States’ reluctance to cooperate with the country, and since the US has been a main partner in most of leading-edge international projects in outer space, China has not been able to join in. This reluctance by the United States was written into a law known as the Wolf Amendment in 2011 and has been renewed annually since then. The Amendment forbids NASA or the Office of Science and Technology Policy “to develop, design, plan, promulgate, implement, or execute a bilateral policy, program, order, or contract of any kind to participate, collaborate, or coordinate bilaterally in any way with China or any Chinese-owned company” without approval from the US Federal Bureau of Investigation (FBI). The bill recounts the risk of “transfer of technology, data, or other information with national security or economic security implications to China or a Chinese-owned company” as the reason behind the prohibition.¹³⁴

This exclusion from major internationally coordinated missions in outer space has led to China’s dependence on its own capabilities and cooperation with only a handful of countries including Russia. China’s outer space activities have been mainly carried out by China Aerospace Science and Technology Corporation (CASC) and China Aerospace Science & Industry Corporation

¹³⁴ For the full text of “DEPARTMENT OF DEFENSE AND FULL-YEAR CONTINUING APPROPRIATIONS ACT, 2011”, see: [Public Law 112-10](#). For the full text of the Consolidated Appropriations Act, 2022, see: [H.R.2471 - Consolidated Appropriations Act, 2022](#)

(CASIC). The two state-owned enterprises have dominated the Chinese space industry for decades. However, a national “civil-military integration” strategy of the Chinese government announced in 2016 introduced a degree of change to the CASC and CASIC duopoly of the Chinese space activities. In the 2016 *Space White Paper*, a state-published document outlining the five-year national development plans, the Chinese central government called for the participation of non-governmental enterprises in the country’s space program (Nie, 2020) (Pollpeter, 2020). This shift of policies along with the rise of private capital due to China’s global economic growth, led to an increase in the number of private enterprises involved in the country’s activities in outer space. In 2019, the Institute for Defense Analyses’ Science and Technology Policy Institute (STPI) in the United States, identified 78 commercial space companies in China, 29 of which are satellite manufacturers, 21 are involved in launch industry, 8 are remote sensing operators, 17 develop communication technologies and 33 manufacture and operate ground stations. The interesting point made in the STPI database is that more than half of those commercial enterprises were founded only after 2015 which is once again evident to a fast-pacing space industry in China.¹³⁵

Despite this recent increase in activities, China’s private space sector has been dominated by “government-monopolized characteristics of space affairs” (Nie, 2019: 7). It is therefore not surprising that the country’s private sector has only been permitted to function, develop, and reach out to the public within the framework of the Chinese government.

It has been argued that China’s tremendous progress in the outer space industry is a way for the country to demonstrate its greatness in both international and national arenas. China’s space

¹³⁵ For the full report, see: [IDA.org, Evaluation of China’s Commercial: September 2019](https://www.ida.org/evaluation-of-china-s-commercial-space-2019)

program has primarily attempted to influence the perceptions of the people of China as to the grandeur and capabilities of the government (Sheehan, 2013).

“[It’s] not to downplay the relevant role in terms of foreign policy objectives assigned to human spaceflight and eventually to a manned lunar landing; rather it is to emphasize that in a vast and complex reality like China’s, the primary political focus has always been inwards, not outwards.” (Aliberti, 2015: 49)

The country’s increasing capabilities in outer space have also aimed to show to the global community that China is not behind world powers in outer space but is at the least, equal. This is demonstrated by China’s consistent marathon approach to competition in outer space, especially with the United States and Russia.

Taking into account its relatively young age and being under the direct control of the state, Chinese private space sector has been an annex to the country’s national space program, assisting in its path towards innovation, production and launch autonomy. Thus, the private space sector in China has been focused on bolstering the country’s international reputation as well as “making money” (Patel, 2021) and therefore, future prosperity. This has also led to a lack of international publicity compared to the private space sector in the West, especially in the United States. Earlier this year, state-run Chinese CGTN news reported that according to China Astronautics Association for Quality (CAAQ), the country’s commercial aerospace industry grew from 59.09 billion USD in 2015 to 160.13 billion USD in 2020. It is by virtue of this rising private space sector that China was able to file for spectrum allocation with the International Telecommunication Union (ITU) in 2020 for two satellite constellations in the Low Earth Orbit (LEO) consisting of over 12,000

satellites. Such plans will be carried out by newly founded private contractors such as China Satellite Network Group.¹³⁶

The other world space power, Russia, also has a growing private space sector. However, the country's outer space activities have developed on a different path than China. As discussed in the previous chapter, Russia's space program began during the Cold War and its development was marked by a fierce competition with the United States. This competition led to a period of rapid technological and scientific developments in outer space. At the end of the Cold War and with the collapse of the Soviet Union, Russia, and the United States as the two world powers in outer space agreed to cooperate and coordinate their efforts in Earth orbits. Russia agreed to the presence of American astronauts on Mir Space Station and the United States agreed to carry Russian cosmonauts on its space shuttles. Through a major partnership, the two countries developed the International Space Station (ISS) and following the retirement of the American space shuttles in 2011, Russia became the main transporter of cargo and crew to and from the ISS with its Soyuz spacecraft.

As part of a global shift of focus towards the private space sector, Russian companies began to emerge as early as the 1990s. They also had a participant, Suborbital Corporation, in the Ansari X Prize contest. However, Russia has been falling behind the United States and China in its commercial space industry due to political and financial conditions surrounding the country and its space program. Similar to the situation in China, Russian private space sector is under centralized control of the Russian government. In addition, Russia's complex global geopolitical status (especially in the past few months and following the Russian invasion of Ukraine), has

¹³⁶ For the full report, see: Zhao Chenchen, [“China's private space companies: A race for the universe”about:blank](#) for CGTN, dated December 24, 2021 and updated January 19, 2022

caused its space program, including the private space sector, to become isolated. This isolation has led to a furthering of technical and infrastructural support of the Russian government for the private space sector especially following the sanctioning of Russian space program by the West. In March 2022, Chief of the Russian Space Agency (Roscosmos) Dmitry Rogozin was reported as saying that the country would support private space companies by giving them access to domestic infrastructure.¹³⁷ This was followed by another ROSCOSMOS announcement in July 2022 indicating that Russia was planning to withdraw from the ISS in 2024 and would launch its own space station in Earth orbit by 2030-2035.¹³⁸ Like China, Russia has not joined the international Artemis Program and has announced plans to launch a joint lunar research base with China in opposition to the US-led Artemis Program.¹³⁹ These new plans are made possible by a state-private cooperation which exists despite its absence from the mainstream media. Thus, the influence of the Russian and the Chinese private space sectors are through their activities and coordination with their respective state-run agencies, rather than through their direct interaction with the public. The dominant discourses of these states are considered the main channel of influence and interaction that connects the civilian-government-private nexus.

The American commercial space sector has also been active since the early days of the Space Race. Between 1960s and early 1980s, private companies developed and manufactured launch vehicles solely under contract with NASA or the Department of Defense (DoD). In the 1970s, government and private operators began using large-scale satellite projects for telecommunication, military intelligence, and imaging services from Earth orbits. While NASA was in charge of those missions,

¹³⁷ [“Russia to boost private space companies amid sanctions over Ukraine, launch 'dozens of spacecraft’”](#) via *India Daily*, dated March 8, 2022

¹³⁸ [“Russia unveils model of proposed space station after leaving ISS”](#) via *The Guardian*, dated August 15, 2022

¹³⁹ [“China Confirms It Will Team Up With Russia to Explore the Moon”](#) via *Bloomberg News*, dated January 28, 2022

the production of launch vehicles was outsourced to private companies such as McDonnell Douglas and General Dynamics.¹⁴⁰

This civilian-military-private cooperation for producing launch vehicles was halted in the late 1970s as the US government developed the shuttle program which became operational in 1981. Shuttles were expensive to manufacture, maintain and repair. Thus, it soon became clear that it was not feasible to depend on the shuttles for all the launch needs of the country. Therefore, the government and the Congress supported the licensing and the regulating of commercially made launch vehicles through the Commercial Space Launch Act in 1984.¹⁴¹ This move by the American government did not receive much support from the private sector as the shuttle program was active and sufficient. Those conditions changed following the first major disaster involving the space shuttle: space shuttle Challenger incident on January 28, 1986. Following the incident and in 1988, President Reagan issued a new National Space Policy in which the government agencies were required to acquire launch vehicles and services from commercial enterprises.¹⁴² McDonnell Douglas succeeded in launching the first US-licensed commercial orbital launch on August 27, 1989, by using its Delta I launch vehicle.

Since then, private companies including the well-known names like Boeing, Lockheed Martin and Northrop Grumman have been working under contracts with the US government for developing, manufacturing, launching, and controlling of several civilian and military aerospace projects. The government, as mentioned in the previous segments, has declared its utmost support for the private space sector through numerous laws and regulations making it easier for those companies to

¹⁴⁰ For a history of the early American commercial space flight, see: [“Origins of the Commercial Space Industry”](#) via the United States Federal Aviation Administration (FAA)

¹⁴¹ For the full text of the Act, see: [“H.R.3942 - Commercial Space Launch Act”about:blank](#) via the United States Library of Congress

¹⁴² For the full text, see: [“Presidential Directive on National Space Policy”](#) via [aerospace.org](#)

become involved with outer space missions since they have introduced unlimited capital, various resources, and huge publicity to the country's space program. This shift towards commercial activities and private enterprises in the industry did not stem solely from financial crises but was also rooted in the neoliberal economic movement of the 1980s which promoted competition in the market and argued against government intervention in economy. This new paradigm was mainly visible in the political rhetoric, ideology and economic policies of Margaret Thatcher in the UK and Ronald Reagan in the United States. (Viala-Gaudefroy, 2019) Neoliberals pushed for free trade and market, low taxes, deregulation, privatization, and balanced budgets. As Monbiot (2016) puts it, neoliberalism saw competition as the fundamental defining feature of human relations and categorized people as consumers. Following Thatcher's and Reagan's rise to power, this new ideology led to "tax cuts for the rich, the crushing of trade unions, deregulation, privatization, outsourcing and competition in public services. Through the IMF, the World Bank, the Maastricht Treaty and the World Trade Organisation, neoliberal policies were imposed – often without democratic consent – on much of the world". (Monbiot, 2016)

Even though there are numerous private space companies of different scope and influence in the United States (*Forbes* put those numbers at 5,582 in 2021).¹⁴³ It was in the early 2000s that new names emerged in the private space sector which changed the public-private paradigms in the global space sector. Those companies are SpaceX, Blue Origin and Virgin Galactic.

Even though the three companies started developing their space vehicles only in the 2000s, their progress has been speedy and has attracted immense global attention. The first and one of the most crucial factors contributing to the popularity of these companies is the fact that they were founded

¹⁴³ John Koestier, "[Space Inc: 10,000 Companies, \\$4T Value ... And 52% American](#)" for *Forbes*, May 22, 2021.

by multibillionaires. Virgin Galactic was founded by the British multibillionaire Richard Branson, SpaceX by the currently wealthiest person in the world Elon Musk, and Blue Origin by currently the second wealthiest person in the world and the founder of Amazon, Jeff Bezos. The three companies have also been highly successful in developing and mass-producing reusable launch vehicles, spacecraft, satellites, and other aerospace technology in a relatively brief time. Virgin Galactic has been mainly focused on space tourism and suborbital spaceflight and has proven very capable, with successful flights and a waiting list for the future ventures. It is important to mention that Virgin Galactic's suborbital flight services are considered luxury and currently can be afforded by the wealthy who are able to spare 450,000 USD for such a trip;¹⁴⁴ a fact that can be shown by looking at the names on the current waiting list of the company.¹⁴⁵ SpaceX and Blue Origin on the other hand have set their goals in Earth orbits and beyond, focusing on developing launch vehicles, satellite megaconstellations and spacecraft while publicizing grand plans for the future on other celestial bodies, asteroids or deep space settlements.

Both SpaceX and Blue Origin have been working under various contracts with the US government for civilian and military launches and have been extremely competitive. However, unlike other companies with similar relationships with the state, SpaceX and Blue Origin have been openly publicizing their plans and development throughout the years. SpaceX's Elon Musk has had a significant presence on social and mass media and has become a public figure whose attitude and comments on numerous political, social, and cultural topics have created disputes in several instances. SpaceX has also been very visible on the media with live broadcasting their launches and keeping their audiences updated on the latest developments with regards to their projects.

¹⁴⁴ For the pricing and payment process, see: [“Reserve your place in history”](#) via [virgingalactic.com](#).

¹⁴⁵ Dominick Reuter, [“600 people have reserved \\$250,000 tickets to fly to space with Virgin Galactic, including celebrities like Tom Hanks, Leonardo DiCaprio, Justin Bieber, and Lady Gaga”](#) for *Insider*, dated July 9, 2021.

Blue Origin on the other hand, has not been as publicly visible as their rival company SpaceX. While the company has been announcing their progress on social media and has been live broadcasting some of their iconic launches, their outreach to the public has been mainly through organizing campaigns, making promotional videos, and using social media.

These two companies are currently the top two companies in the world which 1: have the technological prowess and capital to carry out large-scale missions in Earth orbits and beyond 2: have largely publicized their plans for those missions to an international audience 3: are founded by the top two wealthiest people on the planet (as of mid 2022) whose financial and social status impacts their relationship with the American government as well as the general public. Both companies have, mainly through their founders, commented on sustainability via different mediums. Their current activities and future plans on Earth and in outer space have produced, reproduced, impacted, and propagated a different kind of discourse on sustainability which has had different and more public impact from those of the treaties and the guidelines as discussed in the previous chapter.

While space sustainability discourses at the international policy-making level manipulate the recipients by subtly forming knowledge, ideologies, and attitudes by numerous elite actors through longer periods of time, sustainability discourses of private enterprises like SpaceX and Blue Origin are produced mainly by their respective multibillionaire founders and affect recipients more directly via popular medium such as media and online platforms. Thus, their discourses target the recipients' emotional and psychological states directly and affect a bigger group of recipients in shorter periods of time.

3.4 Space billionaire discourses on sustainability

Since their establishment, Blue Origin in 2000 and SpaceX in 2002, both companies have been visible on several popular platforms such as social media, news, and mass media. This popularity has been due to several elements such as their efforts to manufacture reusable rockets and launch vehicles, their plans for positioning satellite megaconstellations in Earth orbits, their involvement with NASA and the US military for current and future missions; and especially of importance for the argument of this chapter the survivalist, romantic, ideological and manifest destiny driven discourses of their founders about the future of the planet and their plans in response to those changes.

Both billionaires propagate apocalyptic and romantic visions to their audiences in order to persuade them into accepting the ‘dangers’ of not creating ‘colonies’ in space while making them believe that the benefit of ‘survival’ outweighs the challenges in the way of making those colonies. By awakening the classic ‘frontier’ ideology in the minds of the recipients of their sustainability discourses, Musk and Bezos propagate their own version of democratization of space which is the result of provoking ‘survival anxiety’ and offering romantic solutions.

While controversial comments of the founder of SpaceX, Elon Musk, on numerous topics such as American and global politics, Covid 19 pandemic, cryptocurrencies, Twitter, etc. have been widely reported by the media and have dominated social media networks in recent years, it is through his discourses on sustainability of “human civilization” that he has highlighted the major end-goal of his space company for the general public. Musk in numerous occasions has asserted that his

ultimate goal and “philosophy” is to make humans “a spacefaring civilization” and “a multi-planet species”.

“We should work to ensure the survival and long-term prosperity of humanity...that is basically the nature of my philosophy.”¹⁴⁶

Musk has announced Mars as the primary destination for this human “colony”¹⁴⁷, saying a first crewed mission to the planet could take place in 2029.¹⁴⁸ Through the years, Musk has recounted several existential threats to human civilization for the urgency he sees in this planetary relocation. These threats include extinction-level asteroid event, World War III, nuclear annihilation, ultimate expansion of the Sun, technological degradation, religious extremism, Artificial Intelligence takeover, climate apocalypse or more recently, human population decline. In a recent tweet on August 26, 2022, Musk told his more than 100 million followers that: “Population collapse due to low birth rates is a much bigger risk to civilization than global warming”.¹⁴⁹ This is a statement which does not reflect the reality of the current conditions of the planet with climate change causing intense heat waves, droughts, rising sea levels, melting glaciers, warming waters, biosphere loss and subsequently massive climate-driven displacement and migration. While SpaceX has been focusing on realizing Musk’s goals in outer space, he has developed several other companies such as Tesla for electric vehicles, Neuralink for neurological brain chips and The Boring Company for high-speed intra-city underground tunnels.

¹⁴⁶ From [“Italian Tech Week 2021, the fireside chat with Elon Musk and John Elkann”](#) dated September 25, 2021, via La Repubblica on You Tube

¹⁴⁷ For a reference to the use of the word “colony” by Mars, see: [Musk Tweet, November 27, 2012](#)

¹⁴⁸ See: [Musk Tweet, March 16, 2022](#)

¹⁴⁹ See: [Musk Tweet, August 26, 2022](#)

Musk's alarming and apocalyptic discourses and his proposed daring solutions have led to him being viewed as a visionary or even a saviour by some who consider him to be a selfless entrepreneur who has dedicated his capital to the survival of the human civilization. His influence is undeniable and is evident from the coverage of his smallest remarks by the media to him being chosen as "Time's Person of the Year" of 2021. Whereas Musk's discourse recalls a survivalist approach, it constructs and propagates a new attitude.

Central to discussions on survivalism are warnings about the scarcity of resources and the limits to the 'carrying capacity' of Earth's biosphere. Roots of survivalism go back to Thomas Malthus' *Essay on the Principle of Population* in 1798 all the way to the late 20th century when survivalist approaches were popularized once again. Influential works such as Garrett Hardin's *Tragedy of the Commons* and Paul Ehrlich's *The Population Bomb* both in 1968 and *Limits to Growth* by the Club of Rome in 1972, anticipated a future in which Earth's carrying capacity would be breached due to the growth of population, use of resources and increase of production.

Through an apocalyptic discourse, advocates of survivalism have promoted different attitudes towards the future they project. However, as John Dryzek puts it, "the basic storyline of survivalism is that human demands on the carrying capacity of ecosystems threaten to explode out of control, and draconian action needs to be taken in order to curb these demands." (Dryzek, 2005: 38) This belief in taking fierce action has led to an authoritarian political and economic perspective by the survivalists which takes agency away from the public who are considered merely as population without "the required virtue to control their appetites or their procreation" and instead puts it in the hands of the "elites" for whom populations are "only acted upon, as aggregates to be monitored through statistics". (Dryzek, 2005: 39-40)

Advocating for an ideology of conflict, hierarchy and control, the survivalists' discourses are rich with metaphors such as collapse, explosion or cancer and are also filled with statistics and computer-generated projections leading to a glum, apocalyptic and alarming image of the future which can only be ameliorated by the elites as rational actors.

“Civilian scientists began to warn of imminent destruction... Using computer models to make predictions, these doomsday scenarios fit snugly into what was becoming known as the environmental movement pointing out the dangers of pollution, pesticides, and population growth” (Hamblin, 2013: 152)

This approach and its discourses have not been inclusive and are therefore considered by its opponents to be racist and sexist as their advocates have been pressing for harsher methods which have targeted developing countries, women, and ethnic communities.

There are several aspects one needs to take into consideration to realize the extent and depth of the impact of Musk's survivalist sustainability discourses on the general public. The discursive tools and methodologies discussed in the previous chapter are exerted upon the recipients subtly, via different mediums and by multiple actors over often longer periods of time. Musk on the other hand, has interacted with the general public directly via his popular Twitter account or through occasional interviews with media outlets or influencers on You Tube. In recent years, Twitter has proven to be an immensely powerful tool in the hands of the elites through which they have led or in times misled the public for their own interests. Aside from affecting a massive pool of recipients, Twitter's impact is also relatively immediate and fast with users retweeting or reporting the tweets in a matter of seconds after their publication. Musk's utterances have been concise and sharp, fitting the nature of the medium. He has also widely used non-verbal expressions of discourse such

as pictures, graphs and especially ‘memes’ which have added more cognitive force to his discourses.

Musk’s power over the medium, Twitter, has gone beyond a multi-million follower account with his plans in early 2022 to buy Twitter. Even though he terminated the deal later in July 2022, which led to a lawsuit by the company against Musk, on October 3, 2022, he once again offered to go through with the deal.¹⁵⁰ This further shows Musk’s potential for domination over the medium as a “symbolic elite” whose abuse of power (material such as capital or symbolic such as status) is reinforced through “special access to, or control over” social resources such as social or mass media. (Van Dijk, 1996, 2006: 362)

Elon Musk’s discourse has been receiving constant attention from mass media. This attention has enabled him to propagate his attitude and has also provided those attitudes with a certain level of legitimacy. Musk’s anthropocentric attitude that seeks to extend human consciousness “beyond Earth to other planets and star systems”¹⁵¹ and his claims that half of his capital “is intended to help problems on Earth” and the other half “to help establish a self-sustaining city on Mars to ensure continuation of life”¹⁵² sound heroic and visionary to the masses of his followers to whom he has become somewhat of a hero. However, what is generally omitted from his pervasive fame is the reality of his actions which is unfolding in contradiction to his popular discourse. Those contradictions cause one to ask whose survival and prosperity is Musk working towards and whether or not his actions on and around the planet are in support of what he calls the sustainability of human civilization.

¹⁵⁰ See: [Bloomberg: ‘Plot Twist!’: Musk’s Deal for Twitter Lurches Toward a Close, published on October 8, 2022](#)

¹⁵¹ From [“Italian Tech Week 2021, the fireside chat with Elon Musk and John Elkann”](#) dated September 25, 2021, via La Repubblica on YouTube

¹⁵² See: [Musk Tweet, October 12, 2018](#)

While Musk's electric vehicle company Tesla is repeatedly mentioned by his supporters as his contribution to "help problems on Earth", what is generally omitted from this widespread discourse is the fact that Tesla electric vehicles are not affordable for the majority of the world population and have been purchased by upper-class consumers. On the other hand, the metals, and minerals, especially the lithium for the batteries, that are required for the manufacturing of these electric vehicles are being mined with damaging environmental and human impacts.¹⁵³ In addition, more than the eco-friendly aspect of the vehicles, the company's focus has been on developing a cutting-edge self-driving vehicle to curb competition. Musk has even used his apocalyptic attitude and doomsday discourse for advertising his Tesla vehicles. Following the production of the Tesla Cybertruck, in a CNBC TV show in May 2020, Musk referred to the bulletproof exterior of the vehicle and expressed his company's aim "to be the leader in apocalypse technology" saying, "When the apocalypse comes, you'll be glad it's bulletproof".¹⁵⁴

More important for the purpose of this research is the current activities and future plans of Musk in outer space. While Musk's discourses on sustainability have been directed at his plans for future activities in outer space such as settling Mars, his current outer space activities have had numerous economic, social, and environmental impacts on the current status of the planet. While SpaceX's reusable Falcon 9 rocket has transformed launch technology by reducing launch prices and allowing more regular launches for a wider range of operators, it has also caused environmental concerns.¹⁵⁵

¹⁵³ Paris Marx, "[The Electric Vehicle Revolution Will Be Dirty and Unequal](#)" for *Radical Urbanist*, dated June 14, 2019. "[Responsible Minerals Sourcing for Renewable Energy](#)" via *Earthworks*, dated April 17, 2019. Kathleen MacClay, "[Clean vehicle rebates benefit wealthy, white Californians, study finds](#)" for *Berkely News*, dated: November 7, 2016.

¹⁵⁴ For the full interview, see: [ELON MUSK, JAY LENO AND THE 2021 CYBERTRUCK \(FULL SEGMENT\) | Jay Leno's Garage](#) via CNBC Prime on You Tube, dated, May 28, 2020.

¹⁵⁵ See: Martin N. Ross and Patti M. Sheaffer, "Radiative forcing caused by rocket engine emissions", *Earth's Future* Volume 2, Issue 4, Pages 177-196, April 2014. <https://doi.org/10.1002/2013EF000160> Katharine Gammon, "[How the billionaire space race could be one giant leap for pollution](#)" for *The Guardian*, dated July 19, 2021.

The Starlink megaconstellation is growing larger, causing environmental, geopolitical, and scientific challenges both in Earth orbits and on Earth. (For more details refer to Chapter 2)

Through his discourses on sustainability, Musk has redefined survivalist and apocalyptic attitudes towards the future of human civilization through his anti-regulation, capitalist, market oriented and escapist attitude. In his survivalist discourse he does not advocate for curbing extreme use of Earth resources. Instead, he advertises an escape, a ‘colony’ and a frontier. As mentioned in the previous chapter, his company does not intend to abide by the international laws governing human activities on Mars which is in contradiction with the Outer Space Treaty.

Musk’s attitude towards building “a city on Mars” has been merely as a rocket or launch vehicle and habitat engineering problem whose solution is “just a lot of capital”.¹⁵⁶ By using an expansionist language such as Mars “colony” or “Occupy Mars”¹⁵⁷, Musk and SpaceX are promoting ‘conquering’ Mars as the manifest destiny of the 21st century, a new “Wild West”, a frontier to conquer and exploit with no consideration for the ethical, social, political, or even biological challenges of humans travelling and settling on Mars. His ideology is an amalgam of the discursive tools of manipulation as observed in the state-led treaties and guidelines and discussed in the previous chapter, but with a more direct and powerful influence over the general public. Musk has compared a journey to Mars to the expedition journeys to Antarctica in the early 1900s saying the alleged advertisement by Ernest Shackleton for the *Endurance* Expedition would be a good example for a similar ad for a journey to Mars.

¹⁵⁶ For the full interview with Mathias Döpfner, the CEO of Business Insider's parent company, Axel Springer, see: “[Elon Musk reveals Tesla's plan to be at the forefront of a self-driving-car revolution — and why he wants to be buried on Mars](#)” for *Insider*, dated December 5, 2020.

¹⁵⁷ “Occupy Mars” printed T-shirts are sold as SpaceX merchandise and motto, see: [Official SpaceX shop](#)

“[Mars] In the beginning, it's a bit like Shackleton's ad for the Antarctic where he said, it's dangerous, you might die, it's going to be uncomfortable, it's going to be a long journey. Food probably won't be good. There's also this terrible terror, but it's going to be a great adventure, and be one of the most exciting things that ever happened if you don't die.”¹⁵⁸

If this plan is supposedly a plan for humans to survive the apocalypse, who are the people that are going to be saved? In 2019, Musk estimated that the journey to Mars could cost less than 500,000 USD, “low enough that most people in advanced economies could sell their home on Earth & move to Mars if they want.”¹⁵⁹ In a recent interview in April 2022, Musk added that “If moving to Mars costs, for argument’s sake, \$100,000, then I think almost anyone can work and save up and eventually have \$100,000 and be able to go to Mars if they want.”¹⁶⁰

“Needs to be such that anyone can go if they want, with loans available for those who don’t have money.”¹⁶¹

Therefore, according to Musk, joining the Mars “colony” is affordable and accessible for mainly the people of advanced economies who can either afford a price of a hundred-thousand dollars to get to Mars or get a loan and work it off. If they can survive long enough to establish a “colony” on the planet, it will be to lay the foundations for the more affluent to settle it in the future. It is inevitable to see this future as portrayed by Musk, as an escapist attitude which would not serve as a salvation for human civilization or the Earth biosphere, but for the wealthy who could populate a socially and economically separated *Elysium* of humans on Mars and live an ideal and secure life

¹⁵⁸ For the full interview with Mathias Döpfner, the CEO of Business Insider's parent company, Axel Springer, see: “[Elon Musk reveals Tesla's plan to be at the forefront of a self-driving-car revolution — and why he wants to be buried on Mars](#)” for *Insider*, dated December 5, 2020.

¹⁵⁹ See: [Must Tweet, February 10, 2019](#)

¹⁶⁰ For the full interview, see: [Elon Musk: A future worth getting excited about | TED | Tesla Texas Gigafactory interview](#) via TED on YouTube, dated April 17, 2022

¹⁶¹ See: [Musk Tweet: January 16, 2020](#)

while making decisions and ruling over the rest of humans who are deprived and poor, struggling to survive life on a devastated Earth after a climate apocalypse.

Musk's sustainability discourse has been effective since it has touched upon topics which are widely discussed such as the current and future conditions of the planet, climate change, planetary protection, or the fast-paced development of AI. By using a very alarmist and apocalyptic discourse, warning of a planetary collapse in the future, Musk has been using distinctive discursive strategies which van Dijk calls "manipulative prototypes". (van Dijk 2006: 375) These prototypes include topics which target strong emotions such as fear that make the recipients vulnerable to manipulation, and discursive power using social position and status that leads the recipients of the discourse towards accepting the arguments of the elites.

A different, but equally effective form of this ideology and attitude towards sustainability is also found in the discourse of another capable private company, Blue Origin, and its founder Jeff Bezos. Contrary to SpaceX, Blue Origin has not been very forthcoming about the details of the development of its products. Nonetheless, similar to SpaceX, they have successfully tested a reusable rocket and a crew capsule. Whereas SpaceX has had more speedy progress with its rockets and capsules, providing major launch services to and from the International Space Station, Blue Origin has worked on slower speeds abiding by the company's Latin motto "gradatim ferociter," or "step by step, ferociously". While the SpaceX billionaire founder Musk has been the voice of warning about a looming apocalypse that could at any moment make human civilization extinct, Blue Origin's billionaire founder Jeff Bezos has popularized his and his company's plans for a more distant future.

During a press conference in May 2019, Bezos outlined his visions and his company's plans for "millions of people living and working in space for the benefit of Earth." The event which was advertised via Twitter with a mysterious tweet only showing a picture of the *Endurance* expedition mission to Antarctica in the early 1900s¹⁶², was widely covered by the media and was also repeatedly shared on social media platforms. Even though Bezos had talked about his plans in the past, the 2019 press conference enabled him to announce those plans more officially and to a larger audience.

Bezos's discourse on the future and the sustainability of human civilization, similar to Musk's, came from a place of warning. However, his rhetoric was essentially different from that of Musk. Bezos identified his major concern to be an energy crisis in the future.

"A very fundamental long-range problem is that we will run out of energy on Earth...This is just arithmetic. It will happen."¹⁶³

His discourse became alarmist, portraying a more distant future in which humans would need to ration energy where "your children and grandchildren have worse lives than you." However, Bezos's attitude and response to this foreseen crisis is not that of a hurried survivalist planetary move. Bezos offers a more futuristic and as Dryzek (2005) puts it, Promethean response. Prometheus in Greek mythology stole fire from Zeus and by delivering it to humans enabled them to develop tools and to learn how to use and control the world to their benefit. Using this analogy, Dryzek sees Prometheans as having "unlimited confidence in the ability of humans and their technologies to overcome any problem — including environmental problems." (Dryzek, 2005: 51)

¹⁶² See: [Blue Origin Tweet, April 26, 2019](#)

¹⁶³ For the full recording of the event, see: [Going to Space to Benefit Earth](#) via Blue Origin on You Tube, dated May 9, 2019

The power of the Promethean discourse is abundant as it positively promotes perpetual growth such as growth in income, growth in wealth, growth in employment, etc. While that perpetual growth exerts undeniable pressure on the environmental systems by creating pollution, destroying habitats and depletion of resources, a Promethean response is that issues such as pollution can with enough skills and innovation be fixed and corrected. Therefore, this discursive response to environmental crises shows absolute faith in the human ability to face those crises with innovation and further growth. Bezos's solution for the scarcity of energy in the future is neither curbing its use (or as he puts it 'efficiency') nor starting from zero on another planetary body (like Musk). His plan is to mine resources on asteroids and other celestial bodies in the Solar System to be used for the industry and therefore the growth of human civilization. His solution for pollution and environmental repercussions of such extreme use of energy is to move industries and factories into outer space: in Earth orbits, on Lunar surface or on O'Neill 'space colonies', which are theoretical massive cylindrical habitats designed by physicist Gerard O'Neill's in the 1970s.

“This [Earth] is the gem of the Solar System. Why would we do heavy industry here? It's nonsense.”¹⁶⁴

For Bezos, a technological market-oriented utopian escape to outer space is where humans should aim for. The choices humans face for dealing with the “long-range” problem of energy for Bezos is between “stasis and rationing” and “dynamism and growth”. His preferred latter choice could lead to billions of humans living in the Solar System that would give human civilization the opportunity to have “a thousand Mozarts or a thousand Einsteins” while back on Earth, there will

¹⁶⁴ Interview with Space News senior staff writer Jeff Foust In February 2019, via Dave Mosher, “[From utopian space colonies to dissing Elon Musk's Martian dream](#)” for *Insider*, dated February 23, 2019

only be “light industries and residences”.¹⁶⁵ Bezos’s warning followed by a solution, became an ideal marketing rhetoric and lead to the showcasing of Blue Origin’s most recent developments such as New Glenn reusable rocket, New Shepard suborbital launch vehicle and Blue Moon lunar lander. Bezos’s vision “is going to take a long time, [since] it is a big vision” so “that’s for the future generations to figure out the details.”

Dryzek (2005) states that among the modern Prometheans, the agency or the capacity to act is for everyone as economic actors while they pursue their interests. This is contrary to survivalists who deny such agency to the population and treat them as potential problems to be controlled and solved. Bezos, like the Prometheans, calls for the public’s involvement in fulfilling his visions of the future. Future generations are the main recipients of Bezos’s rhetoric especially through the *Club for the Future* foundation founded by Blue Origin in 2019, whose mission is stated as to inspire future generations “to help invent future of life in space.”¹⁶⁶

A promotional video¹⁶⁷ of the foundation begins with groups of children explaining how they love planet Earth as it is “perfect for us”, “it has enough water” or “it’s just very peaceful”. The children continue by saying that we need to save Earth since as far as we know, it is the only one we have. However, “Earth is running out of energy, but space has limitless resources”. In addition, all those resources can be used without impacting the environment here on Earth. The children, with drawings in their hands, mention different possibilities such as harnessing solar energy in space or putting factories in space so that “we can move everything that pollutes Earth into space”. Then, the children mention Blue Origin’s New Shepard rocket and emphasize its reusability. This all,

¹⁶⁵ For the full recording of the event, see: [Going to Space to Benefit Earth](#) via Blue Origin on You Tube, dated May 9, 2019

¹⁶⁶ Club for the Future, founded by Blue Origin, via <https://www.clubforfuture.org/>

¹⁶⁷ For the full video, see: [To Space, for Earthabout:blank](#) via Blue Origin on You Tube, dated December 11, 2021

the children conclude, is going to lead to preserving nature on Earth so that “we can have zoos and gardens [where Earth is] basically a huge national park”. The video is concluded by the children saying: “When my generation grows up, we are going to use space to protect Earth” and “I am very excited about the future”.

The conference and the promotional video, bring to mind the outer space discourses of the 20th century which motivated and subsequently created generations of engineers, astronauts and experts who dedicated their lives to creating their respective countries’ space programs during the Space Race. While those discourses, as described in previous chapters, maneuvered on national pride, geopolitical competition and security uncertainties, the current trend as propagated by Bezos, uses a gentler approach by using a survivalist warning but offering a Promethean solution which does not sound impossible to many, since it depends on innovation and technology as next plausible steps. However, similar to sustainability discourses of Musk, Bezos’s discourse advertises a market-oriented solution for a long-range problem in the future without giving much thought to short-term problems which have plagued our rapidly deteriorating planet as it is right now. As a multibillionaire, Bezos has founded and led one of the largest consumer-oriented companies in the world, Amazon, which is infamous for mistreating its employees and having detrimental environmental impacts. Furthermore, Amazon’s Kuiper mega-constellation will also add to the environmental and geopolitical weight of issues in Earth orbits as discussed in the previous chapter.

Overall, while the visions of future and solutions offered by Bezos offer a more enticing approach than Musk, they still raise the questions of equity, environmental protection, and capitalism, but this time on outer space settlements or as he put it “colonies”. Questions such as who will build the “colonies”? Who will provide service in the “colonies”? What mechanism will regulate the “colonies”? Who will settle the “colonies”? It is pertinent to ask if billionaire capitalists are in reality

only using false hope to manipulate the peoples of the planet by envisioning liberated futures in order to preserve their own current privileges and to fund and popularize their own space race rather than to save the planet.

“It all comes back to hope... the false hope of technological redemption and/or redemption through the premise of collapse then return.” (Niedzvieki, 2015: 255)

Space billionaires are propagating a new kind of expansionism that do not comply with political and economic boundaries. They aim to “colonize” outer space while their activities on and around Earth are grievously harming the biosphere. The wealthy elites use survival or technological progress as a pretext to their capitalist and imperialist intentions on a cosmic scale. After the biosphere is lost or becomes uninhabitable, the elites and their wealthy followers can move to another planetary “colony” or settle on a “deep space colony” which will have been built by the masses of people who were lured into believing the images of fantastical utopias carved into their hearts and minds by the elites’ manipulative discourses.

While the methodology of manipulation by the discourses differs, both multibillionaires’ attitudes and ideologies have been causing more concern than similar discourses did at the dawn of space age. Even though manipulative discursive tools in the hands of the government-military-industrial elites have been highly effective, increased counter-discourses and resistance are arising which if increased and guided, do have the potential to bring about global awareness and in time, change.

Chapter Four

Conclusion

We as humans are deeply influenced by the past, rooted in the present, and are constantly imagining the future. For millennia, we have learned to react and respond to challenges as we face them while looking for methods of adaptation as we move forward. However, those conditions have been gradually changing as we have been witnessing unprecedented environmental, social, and geopolitical changes in recent decades that have proven to be happening faster than we have been able to respond to in effective ways. These changes are especially evident in the space sector which has undergone major shifts in the past decades.

The space industry is now a global phenomenon that has expanded beyond the grips of a handful of countries and is not only affecting international geopolitics, but it also has an immense impact on millions of lives on the planet. Actors in the space industry are pushing the limits of a 21st century space race by increasingly militarizing and weaponizing Earth orbits, developing cutting-edge outer space military technology through R&D projects, launching satellite constellations, setting up space stations and evolving launch vehicles. The private sector, especially space billionaires, are deeply involved in outer space activities and have an increasingly powerful presence in Earth orbits and beyond. The belts of satellites around Earth enable

telecommunication, data and intelligence gathering and imaging for millions of people on the planet and have immense economic impact. Number of actors active in the space sector is growing and the private sector is becoming more involved in current outer space activities as well as plannings for such activities in the future. Innovative technologies are developed regularly, and the public-private nexus is investing billions of dollars in outer space missions leading to new economic dimensions and bringing in more revenue. In parallel to this increasing number of activities and actors in the space industry, there have been alarming increases in the amounts of space debris, environmental degradation, and security uncertainties in Earth orbits. Some activities in Earth orbits are posing existential threats to the biosphere as a result of progressively detrimental geopolitical and environmental impacts. Technological and geopolitical developments have led to advances in both civilian and military uses of outer space. Earth orbits are being increasingly used for a wide variety of military purposes by various countries, and further space military and weapon systems are being developed that would endanger the whole of Earth biosphere.

These developments have led to the rise of widespread discussions about ‘space sustainability’ particularly in Earth orbits, which in proximity to Earth are currently the most used and at the same time imperiled outer space environment as the result of human activities. Consequently, several proposals have been made for making activities in Earth orbits ‘sustainable’. Examples of such proposals include relinquishing activities in Earth orbits except for Earth system science and astronomy (Deudney, 2020), creating legal framework for space debris mitigation and remediation tools (Popova and Schaus, 2018), devising an integrated regulatory regime for aviation and space for space traffic management and control (Weeden, 2021), promoting and facilitating innovation in advancing technology for monitoring and removing debris in Earth orbital environment (Migaud, 2020) or decreasing the number of launches to ensure the long-term sustainability of

orbital space (Murtaza et al., 2020). Such arguments, solutions, and proposals have been based on and have attempted to promote a definition of ‘space sustainability’ which has been accepted as a given and has functioned as the foundation for all the relevant guidelines, proposals, and discussions.

As shown in previous chapters, components of this definition have been developed based on the Outer Space Treaty (1967) which serves as the foundation for frameworks which govern activities in outer space. The OST was created in a different era when outer space was used and considered for purposes different from than those of today. It is important to remind the readers of the fact that there has been no new legally binding international outer space treaty since the Moon Agreement in 1979; and as the latest treaty, it has not been signed by all states¹⁶⁸. In the absence of an updated and holistic regulating mechanism for outer space activities, what has been developed and promoted instead is ‘soft law’ which includes a set of non-binding and voluntary guidelines, best practices and tools which have been somewhat effective in putting together procedures and checklists among actors in the space industry. The UN COPUOS *Guidelines for the Long-term sustainability (LTS) of Outer Space Activities* (2019) is one such tool devised via the United Nations Office for Outer Space Affairs (UNOOSA). Albeit nonbinding and voluntary, the LTS is the most widely recognized set of guidelines for outer space sustainability and together with International Council for Scientific Unions’ Committee on Space Research (COSPAR) Planetary Protection Policy¹⁶⁹ and Space Debris Mitigation Guidelines of COPUOS¹⁷⁰ are considered as hallmarks of efforts to promote outer space sustainability. As effective as these soft

¹⁶⁸ The Moon Agreement was developed by the UNOOSA Legal Subcommittee from 1972 to 1979. The Agreement was adopted by the General Assembly in 1979 in resolution 34/68. As of January 2022, only 22 countries have either signed or ratified this agreement. World space powers China, Russia and the United States have not signed this agreement. For the status of the agreement, see [UNOOSA: Status of International Agreements relating to Activities in Outer Space](#)

¹⁶⁹ COSPAR Policy on Planetary Protection was prepared by the COSPAR Panel on Planetary Protection and approved by the COSPAR Bureau on 17 June 2020. For the text of the policy, see: [COSPAR Policy on Planetary Protection](#)

¹⁷⁰ See, [Space Debris Mitigation Guidelines COPUOS](#)

laws have been, they are not legally binding and moreover, they are also founded upon the suppositions of the international treaties of the 1960s and the 1970s. In addition, a new kind of spacepower has emerged that has been following their own agenda: the private sector and space billionaires who have been promoting their survivalist and futuristic versions of sustainability in order to manipulate the public into supporting their expansionist and capitalist attitudes, working neither to the benefit of the people nor the planet.

As demonstrated previously, the definition of ‘space sustainability’ in official sources or as articulated by space billionaires is the product of discursive powerplay of the political, military, and economic elites. Drawing on van Dijk’s sociocognitive approach to critical discourse analysis, this research demonstrated the ways in which the elites have produced, reinforced, and propagated their manipulative discourses to create and retain a definition of ‘space sustainability’ which has become widely accepted and normalized and therefore has enabled them to exert continuous hegemonic abuse of power towards the Earth biosphere.

The discussed dynamics of discourse, abuse of power and manipulation are disturbing and cause one to feel enraged, disappointed and at times powerless against the ‘powers’ of the elites. However, it is not the time to give in to the darkness of such emotions; instead, those emotions should guide us towards new methods of countering the widespread abuse of power by the elites in order to move towards more ethical and responsible behaviours in outer space before the damages become irreversible. The clock is ticking and as demonstrated by the studies and evidence presented in previous chapters, there is great urgency to this matter.

The goal of this research is not to suggest a stop to exploration of outer space and Earth orbits, but it attempts to prod its audience into the reality behind the façade of the manipulative discourses which have been promoting a version of ‘space sustainability’ that has been misleading, abusive

to the planet and destructive at its core. Facing this reality is both uncomfortable and uplifting. It is uncomfortable since it shatters the ‘awesome’ and ‘wonderous’ veil of several outer space activities, but it is also uplifting because it heralds an awakening among the people of the planet. This awakening is the next step in the solution offered by this study. Though the proposals for ensuring ‘space sustainability’, some of which mentioned earlier, are noble and novel in their efforts, they could not be as effective as they are needed to be, since their foundations are based on socio-political and ideological manipulative discourses which deem those efforts powerless and at times redundant.

In order to address this problem, fundamentals to which the manipulative discourses and their elite producers hang on, need to be redefined and rewritten. New holistic, inclusive, purposeful, and binding foundations need to be devised which are interdisciplinary, intergenerational, and interspecies. The Outer Space Treaty (1967) is a living document. According to Article XV of the treaty, member states may propose amendments which will enter into force “upon their acceptance by a majority of the states parties to the treaty”. This makes it possible to update the fundamental principles and add new necessary articles to the current treaty without the need to restart the lengthy process of devising a new document. It is reasonable for the processes of proposing and introducing the amendments and updates to be carried out under the auspices of the UNOOSA and in particular the COPUOS which have been the focal points for international discussions on policies and codes of conduct for outer space activities and provide an established setting for relevant future discussions. However, for the amendments and new fundamentals to be effective, they should be developed by an international cohort including not only politicians, lawyers, and technical experts but also social scientists, engineers, philosophers, artists, astronomers, zoologists, ecologists and etc. The new document should be dynamic and legally binding. Building

upon the current existing treaty helps accelerate the process and provides more organization. First step will be to clarify, explain or define the fundamentals which are either currently lacking or are, as shown in this study, ambiguous, biased, or too general and are thus misused and abused by the elites.

The new amended treaty should provide clear definitions for phrases such as “peaceful purposes”, “contamination” or “equity”. The deep connection between the military and scientific uses of innovation and technology is undeniable. Development and use of nuclear energy or the creation and development of hadron colliders in the world are only two of such examples. This correlation is also extended to outer space technologies and activities. Development or innovation in outer space is nothing less than a double-edged sword. The outer space medium is used by both scientists and warfighters. The former explores outer space to understand it and the latter uses outer space to dominate it. However, the key factor is that both groups use the same technologies, tools, and innovations, without which neither group can operate and achieve their goals. The telescope has been used as a scientific instrument to chart the skies as well as a ‘spyglasses to provide intelligence for defense or dominance during terrestrial conflicts. Radars have saved lives in emergencies and disasters and have also taken lives during land, sea, and air conflicts. And finally, satellites have been powerful scientific and telecommunication instruments as well as penetrating, invisible tools of secrecy and surveillance which have become eyes in the sky in service of military forces, governments, and warfighters alike. It is not surprising that the top three companies with the highest revenue in annual arms sales in the world in 2019 (as mentioned in Chapter 2), Lockheed Martin, Boeing, Northrop Grumman are also major contributors to scientific outer space projects such as the James Webb Telescope and the Artemis Project for landing on the Moon.

Looking up at Earth orbits, one could observe rings of satellites orbiting the planet as instruments for improving life or as accessories to violence and warmongering against life on Earth. This web of correlations between military and science in outer space is becoming consistently more tangled as innovations boom, more nations join the space race and geopolitics of Earth become further unstable.

Therefore, going beyond modifying the fundamentals, the new regulating system for activities in outer space should address weaponization of outer space as a real and current threat to the planet. Therefore, an elaborate process for disarmament and banning the use of any kind of weapons in, to or from outer space should be considered a priority. These discussions can be held in coordination with the UN First Committee for Disarmament and International Security.

This new system should also define boundaries and regulating mechanisms for ensuring peaceful access to outer space for all nations without allowing the elites to hide behind the discursive loopholes for satisfying their own expansionist and capitalist purposes. For example, the issue of megaconstellation of satellites or any formation or structure in Earth orbits should be urgently addressed. To set limitations on the number of megaconstellations in Earth orbits, a closer collaboration between the COPUOS and the International Telecommunication Union (ITU) is necessary to ensure states' access to orbital and frequency allotments are closely monitored. The 'first come, first served' and the 'launch first, find solution for consequences later' approaches to launching megaconstellations shall be challenged and stopped until prevention and mitigation measures are embedded in the binding mechanisms and therefore become legally binding. This will also enable less technologically, and financially enabled countries to have the opportunity and the motivation to develop their space programs. COPUOS Space Debris Mitigation Guidelines and

the measures described in the LTS guidelines of COPUOS should be included in the treaty rather than remaining as nonbinding ‘soft law’.

Moreover, the new regulatory system should not be limited to protecting the outer space environment only for the sake of humans and human activities but should also include such measures and address concerns for nonhumans and Earth biosphere. This discussion requires the introduction of new articles to the treaty that include numerous aspects such as the matter of oceans and Earth orbits. For instance, oceans and orbits should not be considered insignificant and as backyards for dumping human-produced junk but rather immanent and as part of the Earth organism.

Another crucial and urgent issue that needs to be addressed and introduced in the new mechanism is the private space sector. While the discursive powerplay of the private space sector actors especially space billionaires cannot be currently directly challenged, the scope of their activities and their accountability for the consequences of those activities could be directly addressed by an international regulating mechanism. Currently, the OST does not address the activities of the private sector in outer space directly but rather via their nation states. This has given the private sector the opportunity to carry out their operations in outer space without having to answer to the international community for any harmful or detrimental effects as the result of those operations and instead the private sector has been able to hide behind the shield of their nation states. Therefore, the private sector should be directly addressed and held responsible for their activities in outer space and constraints should be defined for the reach of their activities irrespective of their financial capital or socio-political status. Even though national legislations of countries are beyond the direct reach of international regulating bodies, recommendation for amendments to the OST and ratification of the new mechanisms by the signatories to the treaty will be an effective first

step towards regulating the private sector in outer space. In addition, disgruntled private sector actors should be stopped from carrying on with their operations via launch countries which have not signed or ratified the OST or do not have space programs or national legislations for activities in outer space. To do so, all UN member states should be encouraged to take part in the discussions for the amendments and eventually sign and ratify the treaty irrespective of the status of their space programs. These countries should further be assisted by UNOOSA and COPUOS to develop their space programs and any relevant national legislations regulating those programs.

The aim of this study is to be pragmatic. Therefore, it recognizes the fact that creating new regulating mechanisms of such magnitude for outer space activities in current geopolitical conditions of the planet if not impossible, would require great international coordination and subsequently, time. However, this research has shown the urgency of addressing some of the issues currently affecting and threatening the planet especially weaponization and the constant increase of objects and pollution in Earth orbits. These urgent matters need to be addressed even before starting the processes of amending the OST which could take some time to proceed. Looking back at the lengthy processes which led to the creation of the OST (1967) is evidence of that. The critical issues should be addressed and dealt with urgently via ad hoc committees operating through the COPUOS, results of whose discussions and recommendations could be presented to the General Assembly and subsequently adopted as Resolutions. Especially in the case of weaponization of Earth orbits those Resolutions should be addressed by the UN Security Council in order to make them binding.

Political-military-economic elites have been controlling the discourses on outer space for at least over a century and by doing so, they have transmitted a misleading representation of their activities in outer space to the general public, while those activities in reality have been endangering the

planet. The elites are not eager to get back to the negotiation table or at least to do so in a timely manner and therefore, are holding the whole planet hostage. History has shown us that human civilization is not yet at a point of maturity where its leaders and governments would collectively forego geopolitical and financial greed for ethical and responsible behaviour and therefore a secure future for all. However, this does not change the fact that the conditions of human activities in outer space are at a turning point which could proceed towards either an ethical and responsible future or deteriorate with irreversible effects on Earth's biosphere as a result of environmental collapse or the use of weapons. As examples in history (such as women's rights, race and gender rights and more recently environmental movements) have shown, awareness among the public leads to resistance and in time, to movements which could push the elites into considering, making, and implementing changes. For the awakening to happen, awareness raising needs to take place. Even though the elites have controlled the public's perception and response to outer space activities through their discourses, not all the recipients of the discourses have been manipulated to the "ideal properties of the target of manipulation" (van Dijk, 2006: 375).

Sociocognitive Critical Discourse Studies (SCDS) recognizes that not all recipients are fully controlled and manipulated. There are always those who recognize, resist, and dissent from manipulation and mind control.

"In most real-life situations there will be critical, skeptical, cynical, incredulous or dissident people who are impervious to manipulations." (van Dijk, 2006: 375)

The 'dissidents' to the elites' discursive manipulation have been effectively marginalized and labeled as 'naïve', 'unpatriotic' or 'anti-progress' for as long as the elites have been forming, controlling, and directing the outer space discourses. However, the times are changing. The impacts of the excessively destructive activities of the elites fail to remain hidden since those

effects and their results are becoming evident to the peoples of the planet. For instance, climate-related catastrophes can no longer be completely denied or hidden behind layers of manipulative discourse as the planet is struggling with existential threats and the effects of climate change can be observed all around the planet. In addition, peoples of the world are no longer easily contained by discriminating and abusing discourses of the elites on numerous matters. Another factor which makes the current times different is the rise of social media and the interconnectedness of communities on Earth.

Resistance to the manipulating discourses of the elites begins in the form of counter-discourse. Once such resistance and dissent spreads into more social groups and gains more momentum, enough counter-discourse and information become available for larger groups to become aware and conscious of manipulation and move against the dominant and the manipulators.

Countering the romantic, patriotic, and futuristic discourses about outer space has not been easy, yet again counter-discourses are increasingly becoming more prevalent as the detrimental effects of the activities of the elites in outer space are becoming further known and the elites who have been propagating manipulated discursive models are also being scrutinized by the general public for their abusive behaviours both on the planet and in outer space. This counter-discourse movement started centuries ago when Kepler, Galileo and alike stood up against the discursive propaganda and manipulation of institutions toward our place in the universe. Most of the efforts growing in the past were to counter the fundamental concepts such as unlimited resourceful Earth or frontierism and expansionist behaviours.

A major challenge to the frontier expansionist ideology and the dominant discursive approach of its advocates took shape as the result of awareness and subsequent study of environmental and ecological crises in the 1960s and the 1970s. For instance, the publication of Rachel Carson's

Silent Spring (1962) raised concerns over the detrimental environmental impacts of pesticides. A few years later in 1968, Paul Ehrlich's *Population Bomb* popularized the notion of overpopulation while Garret Hardin's *Tragedy of the Commons* (1968) warned of exploitation of terrestrial resources. A common theme among these and other similar publications was the recognition of the existence of ecological and economic 'limits. Kenneth Boulding in *The Economics of the Coming Spaceship Earth* (1966) popularized the term "spaceship Earth" in order to counter the frontier discourse which propagated a "cowboy economy" portraying Earth as a limitless "open system" allowing "reckless, exploitative, romantic and violent behavior". (Boulding 1966: 7) A major contributor to this counter-discourse was the "Earthrise" picture taken by the Apollo 8 mission in 1968. Apollo 8 was the first crewed mission to successfully leave Earth orbits. While orbiting the Moon and passing over the dark side of the Moon, Lunar Module pilot William Anders observed Earth rising over the horizon and captured the image which became an icon providing a glimpse of Earth as a whole planet from a distance and. During a live broadcast from the spacecraft, the Command Module Pilot Jim Lovell said, "The vast loneliness is awe-inspiring, and it makes you realize just what you have back there on Earth."¹⁷¹

¹⁷¹For more details, see: [NASA History: Apollo 8 Mission https://www.nasa.gov/mission_pages/apollo/apollo-8.html](https://www.nasa.gov/mission_pages/apollo/apollo-8.html)



Figure 11. image credit NASA, accessed via NASA Apollo 8 History¹⁷²

This new perspective gave rise to the recognition of ecological and economic limits of Earth as represented by the concept of a “spaceship” leading to disillusionment with the idea of limitlessness and in opposition to frontierism. Earth as a spaceship with a closed system means that all parts of the system are linked and as Boulding puts it, the closed “spaceship Earth” is “without unlimited reservoirs of anything either for extraction or for pollution” (1966: 7).

“Issues of sustainability are ultimately issues about limits... issues of equity and distribution (between subgroups and generations of our species and between our species and others) are also issues of limits.” (Costanza, 1989: 5)

This perspective towards Earth as a closed system with its limitations was followed by the Gaia hypothesis which advocated an approach that positions humans as embedded in the planet’s

¹⁷² For more details, see: [NASA History: Apollo 8 Missionhttps://www.nasa.gov/mission_pages/apollo/apollo-8.html](https://www.nasa.gov/mission_pages/apollo/apollo-8.html)

ecological system hence as a part of the environment and not separate from it. Introduced by chemist James Lovelock and co-developed by microbiologist Lynn Margulis in the 1970s, the Gaia hypothesis assumes a holistic approach arguing that all lifeforms and their surroundings integrate and create a complex and self-regulating system which retains life-sustaining conditions on Earth. The footprints of both those perspectives can be seen in recognizing the new geological epoch Anthropocene, which we are currently living in, and is marked by the visible impacts of humans in the planet's geological records.

While such counter-discourse efforts were focused on more fundamental ideologies and attitudes propagated by the discourses of the elites, more recent counter-discourse endeavors have been targeting the space industry more directly, its agenda and impacts more directly. With their wide range of reach and impact, entertainment and media have been increasingly used by the elites to enforce their discursive manipulation of the audience. However, on the other hand, there has also been an increase in the number of works of literature and movies which have shaped an effort for counter-discourse specifically directed towards current and future conditions of human outer space activities in Earth orbits which are alarmingly becoming more targeted and congested. A wide range of science fiction authors and moviemakers have been addressing numerous aspects of outer space activities in their works for decades. While detailed look at all those works is beyond the scope of this paper, it is worth mentioning a selected number of more recent works which have addressed issues of concern in Earth orbits.

Gravity (2013) tells the story of astronauts who get stranded in Earth orbits as their space shuttle and the International Space Station (ISS) are hit by the space debris created after a defunct satellite is shot down from Earth. The movie is a great contributor to raising awareness about the sensitivities and urgency of the situation with regards to using weapons in outer space and space

debris in Earth orbits and made the audience aware of potential Kessler Syndrome that could happen in Earth orbits and its catastrophic impacts. *Orbital Cloud* (2014) A novel by the Japanese author Taiyo Fujii explores a wide range of points such as space debris, weapons, space tourism and international geopolitics all converging in Earth orbits.

Planetes (1999-2004) is a series of Japanese Manga written by Makoto Yukimura which has also been made into an animation series. The series tells the story of the crew of a spacecraft working for the Space Debris Section whose mission is to prevent space debris in Earth orbits collide with satellites, space stations, spacecraft, and Earth. The series offers a realistic representation of travelling in space and its harsh effects on human biology and psychology. Other issues of importance explored during the course of the series include potential Kessler Syndrome, monopolization of space resources by the elites, the struggles of poorer nations for survival on Earth and in space as well as the complexity of developing international regulating mechanisms for activities in outer space.

Expanse (2011-2021) by Daniel Abraham and Ty Franck is another novel series which have also been adapted for TV and have received positive reviews and attention from critics and audiences alike. While the series does not specifically address human activities in Earth orbits only, it focuses on human settlements in Solar System, the rising tensions among those settlements as the result of a widening gap between the living conditions of the Belters who live on outer planets and work in harsh conditions to provide resources for other settlements and the Inners living on the inner planets such as Earth and Mars. Geopolitics and regulating mechanisms, weaponization and militarization of human settlements and later in the series complications of encountering extra-terrestrial intelligences while humans are still struggling to develop a fair and responsible social and political system are among other topics impressively explored in this series.

Geostorm (2017) recounts the story of catastrophic effects of climate change on the planet and the creation of a constellation of satellites in Earth orbits which can manipulate and control weather patterns around the globe. However, the control of the constellation is taken over by individuals who plan to use it to wipe out their enemies and ‘rule the world’, therefore, they are able to take the entire world hostage. The movie provides a particularly good example of the probable consequences of having megaconstellations of satellites in space while there is no mechanism to effectively control and regulate them.

Space Sweepers (2021) is a Korean science fiction telling the story of a future in which Earth has become almost inhabitable. The elites live on an orbiting settlement while the rest of the people either live on a heavily polluted Earth or work as space sweepers who collect the space debris in Earth orbits and sell them to factories in order to make a living and survive. And a more recent example, *Don’t Look Up* (2021) is about two astronomers who attempt to warn humanity about a planet killing comet that would destroy human civilization on Earth but are faced with indifference as the result of ignorance, greed and self-interest by government, media and even celebrities. While the comet impact event is used as an allegory for the climate crisis the planet is currently facing, it has much in common with similar kinds of warning about the conditions of Earth orbits.

There has also been a rise in the number of late-night TV shows mentioning the space-related news and criticizing the space billionaires’ activities in outer space, especially their expensive suborbital flights. For instance, Stephen Colbert dedicated a recurring segment of *the Late Show* to space news and voiced his criticism towards various aspects of the industry on several occasions.

Non-government organizations have also been active in awareness raising about the conditions of Earth orbits and have been providing tools that enable the general public to track the effects of numerous activities in outer space. The *Union of Concerned Scientists* keeps a regularly updated

database of satellites in orbit with their details such as the country of origin, purpose and status.¹⁷³

Secure World Foundation offers an expansive source of information and guidelines in order to “develop and promote ideas and actions to achieve the secure, sustainable, and peaceful uses of outer space benefiting Earth and all its peoples.”¹⁷⁴

A group of more than forty experts from around the world created the public *Losing the Sky* event in June 2021 in which they discussed in detail the issue of megaconstellations of satellites in orbit and their contribution to the increase of space debris and blocking the view of ground astronomers. Panels were also dedicated to discussing the lack of proper legal frameworks to regulate the existence and operations of such megaconstellations.¹⁷⁵ Media outlets have also been publishing more pieces about the conditions of the space sector, reporting on important events or publishing articles about issues such as space debris, use of weapons in Earth orbit, regulating mechanism of outer space activities or the space race among space billionaires.¹⁷⁶ There have also been increasing number of social media posts, publications and academic papers shedding light on different aspects of outer space activities.

These increases in the number and shift in the focus of counter-discourses about outer space activities will need to be followed by civil movements by the public similar to what is happening with regards to climate change. Civil movements around the world could be in different forms such as rallies, public events and media and academic coverage. For example, an ideal event to

¹⁷³ [Union of Concerned Scientists Satellite Database](#)

¹⁷⁴ For the mission statement and history of Secure World Foundation, see: [Secure World Foundation: Who we are](#)

¹⁷⁵ For details of the event, see: [Losing the Sky Event](#) for the recording of the public event, see: [YouTube: Losing the Sky recording](#)

¹⁷⁶ For examples of such coverage, see: [NPR: Space Debris Has Reached A 'Tipping Point'](#), [Space.com: Kessler Syndrome and the space debris problem](#), [The Guardian: Orbital space around Earth must be protected amid rise in satellites, say scientists](#), [Space Daily: The countries that have the most junk in Space](#), [The Economist: Tracking space debris is a growing business](#), [The Guardian: How the billionaire space race could be one giant leap for pollution](#), [Harper's Magazine: Capital Flight](#).

happen would be similar to the following invitation to a rally that calls for action regarding the climate crisis on the planet.



Figure 12: Picture taken by the researcher in Toronto, on November 11, 2022

Awakening leads to resistance and in time leads to movements that could push the elites into considering Earth orbits not as a frontier to conquer and exploit or a separate backyard to dispose of human-made junk in but as embedded in this tremendously valuable and beautiful Earth which is home to not only humans but to every single being on it. This change of attitude will subsequently lead us towards responsible and ethical presence and operation in outer space. This

research has also been carried out with its goal being raising awareness. As a former journalist and current teacher, my goal has been to share this research through publication with both academic (via journals) and public (via a small and affordable book, public events, and social media) audiences.

Both our planet and our discourses are on the verge of collapse under the weight of human activities and human greed. Just as tools and pragmatic solutions are needed to help tackle material catastrophes, discursive intervention and mediation is also essential to guide those tools and solutions through the right paths. Plenty of intellectual and civil involvement is vital to avoid geopolitical and environmental catastrophe on Earth and in Earth orbits. Space expansionist elites have been hiding the surly realities of their actions, intentions, and plans behind the veil of a romantic and forward-moving rhetoric. The slyness of the elites and the naivete of their followers have the potential to become the doom of Earth.

Our intentions for the desire to leave Earth and explore other worlds make all the difference; whether we want to explore to find our cosmic place and learn in the process or have the desire to flee Earth as a manifest destiny to become wealthier and more in numbers. We are embedded in the ecology of our planet and to get the chance to explore other worlds in the future, we need to protect our world as it will always be 'home.' Space exploration is a scientific vision which is driven by the desire to learn and know and must not be envisioned as a tool for exploitation and conquering. Similar to any other kind of science, space exploration needs to be done in a paced manner to ensure the respect of due processes. Reaching maximum capacity in Earth orbits or landing crewed spacecrafts on Mars and beyond in this decade without consideration for the consequences is not a race that is worth winning. Instead of a detrimental chronic situation of geopolitical competition and capitalist end goals, we as Earthlings must learn to put our potentials,

resources, and capabilities together and help save Earth and meanwhile take the time to develop ethical and pragmatic mechanism to help us reach to our cosmic place in due time.

“We should not boldly go, but humbly go, and only go when we are fully ready for everything the journey entails, including a robust sense of ethical responsibility towards the life and environments we will encounter.” (Dator, 2012: 98)

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