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Astro-Ethics: A Philosophical Consideration From The Perspective Of "Some Ethical Deficiency"

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Abstract:- The discussion of astro-ethics is fundamentally a part of applied ethics. Because it involves the philosophical engagement with and normative evaluation of novel & concrete moral challenges arising from humanity's expanding presence beyond Earth, such as those concerning the exploration of outer space, the potential existence of non-terrestrial life, the stewardship of the celestial environment & equitable use of extraterrestrial resources. The discussion of astro-ethics is usually not talked about too much in philosophy. Yet, this discussion is very much beneficial from the philosophical perspective because it enables us to think about right & wrong in new areas, changes how we understand our responsibilities & prepares us to deal with the big ethical or moral questions that come with exploring & living in space. This article explores various key aspects of astro-ethics, such as – its nature, origin, and related ethical guidelines, etc. This article explores certain ethical deficiencies within the domain of astro-ethics and seeks to deepen their philosophical significance by situating them within the framework of some philosophical theories, such as environmental ethics, deep ecology, Rawlsian ethics, Mill's utilitarianism and Kantian ethics, thereby enriching the discourse with broader normative perspectives. Thus, it can be said that this discussion holds philosophical originality while also bearing significant practical relevance, bridging philosophical inquiry with real-world ethical implications.

Keywords – astro-ethics, outer space, ethical deficiency, environmental ethics, deep ecology, Rawlsian ethics, Kantian ethics, Mill's utilitarianism, philosophical originality, practical relevance.

Introduction - The discussion of astro ethics is crucial for philosophy because it explores the ethical, moral & philosophical implications of humanity's activity in space. As space exploration & colonization become more feasible, these discussions help address key questions about our responsibilities, human values & the future of humanity. Astro ethics analysis is very important for our philosophical perspectives because it focuses on moral consideration for non-earth life, environmental ethics, equality & justice, etc. So we can see that the discussion of space ethics has not been seen among previous researchers. Among the different domains of ethics of AI, astro ethics is the most important domain. Because AI ethics & astro ethics are interconnected fields because both deal with the ethical implications of transformative technology & activities that push the boundaries of human experience & understanding. So, for that reason, the discussion of astro ethics is very crucial in the current philosophical context.

Through the course of this discussion, which has served as a foundational lens for this literature review, several conceptual and ethical gaps have come to light, inviting deeper inquiry and critical reflection. These ethical deficiencies are –

- Can today's space exploration or space activity be called environmentally friendly at all?
- Can cross-culturally or universally accepted ethical guidelines be established to guide global conduct in astro-space activities?
- Space ethics and space law do not discuss the concept of human rights at all. So the life of every astronaut holds intrinsic value, and with that dignity comes the moral imperatives to ensure their safe return to Earth. So, is there any moral or ethical principle / framework in this regard in astro-physical law?
- In the 21st century, there is an increasing number of misery, poverty, unemployment, inflation, ocean acidification & chemical pollution and various environmental impacts on our earth. So, is it ethical to spend millions of dollars on space technology without properly identifying or solving these issues that currently exist on Earth?
- Various space activities or space exploration are causing environmental pollution in lower Earth orbit, which is called "Kessler Syndrome". Within the framework of space ethics, there are no guiding moral principles adequately addressing the phenomenon of Kessler Syndrome.

Among the scholarly works consulted for this literature review, there was a marked absence of discourse addressing these particular lacunae in the existing body of research.

This discussion shall be advanced through a focused engagement with select themes, each serving as a conceptual conduit for deeper inquiry. These themes are –

1. Why is it essential to incorporate the vastness of the discussion of astrophysical space into our philosophical reflection on being, knowledge, and the cosmos?
2. Discuss the origin of astro-ethics or space ethics.
3. Discussion of astro-ethics related to various moral or ethical guidelines in various organizations, such as NASA, SpaceX, etc.
4. Discuss astro-ethics related to various ethical guidelines.
5. Discuss moral duty in colonizing the New World.
6. Discuss the moral status of extraterritorial life.
7. Critical Analysis.

- So, the flow of the discussion henceforth will unfold in accordance with the thematic structure previously established.

Methodology:-

This discussion primarily falls under the domain of applied ethics. It mainly explores some ethical deficiencies of human-made space exploration or space activity. So in this context, a profound philosophical inquiry into nature & principles of astro-ethics is required. In this case, it becomes imperative to engage in a thoughtful examination of the diverse ethical principles and maxims that underpin our moral reasoning. So, this discussion is based on some kind of "Theoretical Perspectives". In this case, a rigorous conceptual analysis is indispensable when delving into the theoretical dimension of the research approach. This "Conceptual Analysis" it is a part of "Qualitative Research Approach". By engaging with the qualitative research paradigm, the researcher embarks on the journey of imperative inquiry, seeking to grasp the subtle complexities of the phenomenon under investigation. This method allows for the emergence of insight that transcends surface-level facts, capturing the depth of human experience and the contextual meaning that shaped it. Thereby guiding the researcher toward a more thoughtful & meaningful conclusion.

Discussion:-

The discussion of astrophysical space plays a very important role in the philosophical context. Space exploration serves a cultural & inspirational purpose by fulfilling a deep need to understand the world, address the question about the origin of life and the nature of the universe, and expand the notion of what it means to be human. Similarly, the discussion of astro-physical space is crucial for philosophy because it explores extraterrestrial life, raises profound philosophical questions about our uniqueness, the definition of life, and the potential for other forms of consciousness in the universe. Similarly, astro-physical space research constantly pushes the boundaries of our understanding, reminding us of the limitations of our current knowledge & the vastness of the unknown. The study of astro-physical space often confronts the limit of human understanding, raising questions about what we can truly know & how we acquire knowledge. Astro-physical space offers insight into the origin & structure of the universe, which intersect with philosophical discussion on creation. Discussion of astro-physical space serves as a rich case study for examining the philosophy of science, including the nature of scientific theory. Lastly, the discussion of this context raises ethical questions about humanity's responsibility in the cosmos, including how we should treat other celestial bodies and potential extraterrestrial life. Although at first glance, the context of astro-physical space may appear unrelated to philosophy. In an analytical or ethical sense, it holds significant relevance within a philosophical context. The reason is that, when we viewed this context from a philosophical standpoint, the discussion of this astrophysical space brings up several significant questions. These questions may arise within an ethical context or from the standpoint of analytic philosophy or the philosophy of science.

Now the present day, astrophysical activity and space exploration are conducted by AI technology. Therefore, it becomes necessary to establish an ethical framework or set of guidelines. Because the value of space exploration has been sufficiently concerned with the environmental impact of such activities, and whether it is possible to generate the consensus needed to embed an ethical approach to space exploration, leading to robust planetary protection [Taylor, Newman, 2018]. The environmental values present in space policy must be one of the protections through sustainable conservation, while recognizing the need to use and work in space. We can see that various space missions of NASA and SpaceX are being conducted based on AI technologies. In this case, if we hear how these missions can be in the future, they will seem like science fiction to us now. That's why it's crucial to put ethical principles into practice in this context. Because ethics will always extend our thought and thereby make our future hypotheticals easier to understand. The need for ethical guidelines has increased due to the reliance on current AI-based space explorations. Because astro-physical ethical guidelines are essential for space exploration and activities because they ensure responsible use, prevent environmental damage, and respect extraterrestrial life, etc.

The discussion of "Astro-ethics" emerged in the early years of science fiction, with the writings of Tsiolkovsky & later Gerard O'Neil [Taylor & Newman, 2018]. The concept of astro-ethics originates from the humanities' increasing exploration of outer space & the associated moral, philosophical & practical questions. Philosophers & ethicists started debating astro-physical space-related ethical issues as early as the mid-20th century. Discussion of "Astro-ethics" revolved around the human responsibility towards extra extraterrestrial environment, potential alien life,& fair distribution of space resources. Philosophers & ethicists are encouraged to discuss astro-ethics related to various factors, these are – human rights, rights of other entities, human expansion & equality, justice, & environmental ethics, etc. Similarly, the ethical value system of space, particularly the outward impact of humanity, has traditionally been of little concern and has only come to notice when mated with scientific discussion such as those regarding "Kessler Syndrome". So, this is how the discussion of astro-ethics originated – not merely as a set of rules for behavior beyond Earth but as a necessary expansion of moral thought provoked by humanity's confrontation with the vastness of the cosmos and its potential to affect it.

NASA has conceived a guiding philosophy – an ethical compass – by which the pursuit of space exploration or space activity is harmonized with responsibility, ensuring that the boundless quest for knowledge remains tethered to principles of integrity and stewardship. This framework is built on several key principles designed to ensure that AI technology is developed & deployed responsibly. These are –

1. Fair:- Human-made anthropocentric space activity or space exploration should always include considerations regarding how to treat people, including refining solutions to mitigate discrimination & bias, preventing covert manipulation, and supporting diversity and inclusion.
2. Explainable & Transparent:- Space exploration or activity should always protect intellectual property & include risk management in its construction & use.
3. Accountable -:- It generally means that any activities carried out in astrophysical space, whether by governments, private companies, or individuals, should be conducted in a responsible, open, and ethically sound manner with careful consideration of their global consequences and long-term effects.
4. Secure & safe:- Space activity or exploration should always respect privacy and do not harm human beings and other terrestrial bodies.
5. Human-centric & societally beneficial:- Human-made anthropocentric space activity should protect the human legal system & it must provide benefit to society.

Similarly, SpaceX, a private aerospace manufacturer company founded by Elon Musk, has publicly articulated formal ethical guidelines or principles related to space exploration. These guidelines are –

1. Mission Driven Innovation:- The prioritization of outer space innovation and explorations reflects a belief in long-term survival and growth for the entire humanity, emphasizing progress over immediate gains.
2. Environmental Responsibility:- Responsibility for outer space explorations is demonstrated to sustainability in space and on earth, mitigating environmental harm.
3. Transparency & Accountability:- Transparency build trust with stakeholders and fosters public engagement in space explorations.
4. Focus on human safety:- A commitment to human safety aligns with broader ethical principles of minimizing harm.
5. Accessibility & Democratization of space:- This principle reflects a belief in equitable access to space, fostering inclusivity in exploration.

Similarly, the Indian Space Research Organization (ISRO), as a government agency, operates under the broader ethical principles regarding outer space exploration. These guidelines are –

1. Peaceful uses of space: Space exploration always prioritizes science, exploration, and societal benefit over militarization or conflict.
2. Societal benefit:- Human-made anthropocentric space exploration is always committed to improving the quality of life and reducing inequality using space technology.
3. Environmental sustainability:- Space exploration always aligns with the global effort to preserve Earth's environment and space ecosystem.
4. International Cooperation:- Always promote global solidarity, knowledge sharing & mutual benefit of space exploration.
5. Inclusivity & Accessibility:- Always encourage global equity in space exploration and technology benefits.

From the philosophical perspectives, the ethical frameworks upheld by organizations like ISRO, NASA, and SpaceX represent some of the most vital guiding principles or frameworks in astro-ethics. These principles reflect humanity's deeper responsibility to act with wisdom, foresight, and moral integrity as we extend our presence beyond Earth, serving not only our immediate interest but the broader good of life, the cosmos, and future generations.

In addition, certain distinct ethical frameworks are intrinsically connected to the philosophical discourse of astro-ethics.

- Hardinian Theory – The Hardinian Ethical Theory for space is rooted in the ideas of ecologist Garrett Hardinian, best known for his concept "Tragedy of the Commons". It likely refers to the principle related to ethical consideration in the humanities exploration and use of space. This theory states that, in a shared resource system, users of that system will act in their own self-interest and consume the resources accordingly. Suppose that consumption is multiplied on a scale of a full community, without any proper regulation or limitation. In that case, it will result in depletion or despoiling of the very thing upon which

interest relies, the common. So, that is why "Hardinian Ethics" would advocate for a strong governance framework to prevent unregulated exploitation of space, which could lead to depletion, conflict, and environmental damage. The Hardinian Ethical Perspective on Outer Space is profoundly philosophical, as it confronts essential moral & existential dilemmas concerning the appropriate conduct of humanity when venturing into uncharted realms, particularly those that lie beyond our terrestrial boundaries.

- Existential ethics:- Existential ethics in the context of outer space exploration, which represents a philosophical inquiry rooted in existentialist tradition. Particularly the thought of Jean Paul Sartre, Martin Heidegger, and Simone de Beauvoir, which seeks to illuminate the moral context of human freedom, responsibility and self-definition as they unfold within the boundless and indifferent expanse of the cosmos. According to this ethical theory, the actions are ethical if they contribute to humanity's survival & long-term flourishing. This existential ethics is rooted to space ethics-related ethical theories. Because it developed a strategy to protect the Earth from various space exploration-related impacts. As its core, the existential ethics for outer space embodies philosophy in action, transposing enduring philosophical inquiry into the boundless theater of the cosmos, and compelling us to reconsider the very nature of morality. freedom and human identity amidst the infinite expanse beyond our terrestrial confines.
- Post-Humanistic ethics: Post-Humanistic ethics is related to outer space in that it questions and redefines the conventional, human-centered perspective on life, moral worth, and responsibility, particularly in the context of the vast, unfamiliar, and non-human realms that characterize the cosmos. So expand our moral consideration to include non-human entities like the cosmos and extraterrestrial life etc. So this post-humanist ethics is related to space ethics, because it ensures that fair & safe use of artificial intelligence in space activity or explorations. Similarly, it ensures that, ethical responsibility to avoid harm to potential extraterrestrial life forms. Post-humanist ethics always expand moral consideration to potential non-human or post biological life forms. So, post-humanistic ethics always highlight the deep interrelation among all forms of existence i.e – being, system and environment. It emphasizes that none exist in isolation. So, post-humanistic ethics always encourage planetary scale and even cosmic scale ethics.
- Anthropocentric ethics:- Anthropocentric ethics, which positions humans as the primary or most significant moral agent, plays a fundamental role in shaping many contemporary space endeavors. Anthropocentric ethics always ensure that space missions are primarily in terms of their usefulness to humanity. Anthropocentric ethics always ignore the intrinsic value of non-human systems. Anthropocentric ethics always conceptualize space activity through a human-centered lens, interpreting the cosmos primarily as a domain to be explored, utilized, or transformed in the service of human survival, epistemic expansion, and material gain.

Hence, these ethical frameworks or theories hold profound significance and enduring relevance within the philosophical discourse on space ethics.

Whenever we investigate the unknown world or the vastness of outer space, a distinct moral obligation inevitably arises, binding us to consider the ethical dimension of our journey. Thus, the discussion of moral duty in the colonizing of the new world demands a unique and profound ethical & philosophical reflection. Normally, a "Moral Duty" means –"it is a responsibility or obligation to act in a way that is considered ethically right or morally good, based on the principle of justice, kindness, respect & others". So, whenever we are going to investigate or explore a new world or venture into outer space, the significance of the moral responsibility naturally presents itself in our consciousness. These responsibilities are: 1. While conducting space exploration-related activities, it is the duty of every astronaut and individual to safeguard the outer space environment from harm. 2. When undertaking outer space activity or exploration, it is imperative that every astronaut as a complete being of the body & mind, remain mindful of the preservation of their own mental well-being. Thus, the care for the mental wellness or mental well-being of the astronauts emerges as a vital moral obligation. Because when a human being, in the form of astronauts, is served from the familiar embrace of Earth and thrust into the vast solitude of outer space, they become vulnerable to inner turmoil, they face the shadows of stress, depression & inner conflict. Therefore, every astronaut must not be regarded merely as a means to an end but honored as an end in themselves. 3. A diverse array of materials is summoned in the crafting of various materials, each serving the greater endeavor of humanity's exploration of the cosmos. These resource materials include lead, mercury, cadmium, etc. So these resource materials damage humans' neurological function on the one hand and similarly, these resource materials

also have the potential for environmental damage. So, it becomes essential to recognize our moral responsibility toward these material resources, ensuring that their use neither endangers human well-being nor disrupts the harmony of our environment 4. Apart from this, in the course of space exploration and related activities, we must remain vigilant of the peril of backward contamination by potentially hazardous extraterrestrial life or more specifically, alien life. In this regard, it is our profound moral duty to safeguard both our planet and its inhabitants from such unseen threats. Because of that, perilous extraterrestrial life, or more specifically, alien lives, would return to our own world, and then it would pose an existential threat to the very essence of humanity's survival. Therefore in the context of "Safeguarding human survival," addressing this essence becomes an inherent facet of our moral duty. So this anthropocentric perspective is very much beneficial in the discussion of this context. 5. As humanity deepens its explorations of the cosmos, it will bring several benefit of our humanity because each venture beyond Earth sparks wave of technological innovation, fuels economic advancement and broadens the horizons of human survival. Moreover, the persistent pursuit of space exploration fosters a vigilant guardianship over our own world, fortifying planetary defense & deepening our understanding of the vast environment beyond our cradle. In reaching outward or transcendental environment, we are not expand our knowledge but also secure the future of life itself, weaving a closer bond between our fragile earth and the infinite unknown. But if we explore or use outer space too much, it could cause damage to the space environment. So we should preserve the outer space environment for our future generations. So by preserving the cleanliness and safety of space, future generations will be able to uncover new resources, drive technological progress & explore potential new homes without having to deal with avoidable problems we might otherwise leave behind. So the greater good of this space exploration should be distributed equally among our future generation. So, it is our ethical obligation to regard outer space as an "End", rather than not merely as a tool for our use.

Likewise, extraterrestrial life in outer space should be recognized as having moral status. If outer space activities or space explorations lead to the discovery of "Life beyond Earth", then we bear an ethical responsibility or obligation towards that life. Therefore, ethical responsibility should extend beyond just human beings to include all other life forms. In this regard, we ought to uphold ethical responsibilities or ethical obligations towards all living creatures. Just as all life on Earth holds inherently valuable for us, similarly any discovery of life beyond earth through space explorations should likewise be regarded as inherently valuable. So, all forms of life, whether is it earthly life or it is extraterrestrial life should not be treated merely as a means to an end, but rather should be respected and valued as end in themselves. So, in this case or context , we need to adopt or adhere the "Biocentric Perspective", because according to this view, "All forms of life are inherently valuable".

So, we must closely monitor outer space activities or space explorations to ensure that extraterrestrial life or life beyond Earth is neither harmed nor made to suffer. As the saying goes, " Do not destroy or interfere with life you don't understand", actually that means even if we do not fully comprehend life beyond Earth or extraterrestrial life, but we still obligated to respect it and must refrain from destroying or exploiting it. Therefore, if space exploration or space activity leads to the discovery of life beyond Earth, an important question will emerge: "Does extraterrestrial life or life beyond Earth deserve moral consideration"? The answer is "Yes", because extraterrestrial life, whether is bacterial life or more complex alien life does deserves moral consideration. So when we say that, extraterrestrial life or life beyond Earth deserves moral consideration, then we are also implying that the importance of moral consideration extends beyond our own planet. This means that – whenever life exists, whatever on earth or elsewhere the question of moral consideration inevitably arises.

Therefore, "Life" itself, whatever it is, earthly life or life beyond earth that holds a unique moral status and warrants moral considerations in every instance. So it must be acknowledged that extraterrestrial life may be fundamentally distinct from human life, for the experience of suffering, harm, or flourishing that defines human existence may not manifest in the same way or perhaps at all in the form of life beyond Earth. So humanity must rethink or reconsider the foundation of the ethical framework concerning extraterrestrial life or life beyond Earth, because life beyond Earth is radically different from our earthly existence.

The title of this discussion includes the phrase "Some Ethical Deficiency." This term indicates a gap or lacuna in the debate of astrological ethics. So these issues will be examined in detail through critical analysis below –

- Can today's space exploration or space activity be called environmentally friendly at all?

Are present-day space explorations completely harmless to the environment? – The answer is 'NO'. Because various materials used in spacecraft construction impact our environment in diverse ways. As well as during the launch of these spacecraft, a huge fire occurred, in this case, as a result of that fire, various types of chemicals are mixed in our world, due to which our world's environment is being polluted. So that is why the discussion of environmental ethics is very much beneficial in the discussion of space activity. Because environmental ethics always focus on – our earth ecosystem. So that's why the discussion of environmental ethics is very much beneficial in the discussion of space activity. So all space research organizations ought to follow an environmental ethical approach, with an emphasis on "Deep Ecology". Deep ecology is an environmental ethical framework, adopted by Arne Naess. According to deep ecology, "All living beings have intrinsic worth independent of their utility to human ends, their mere existence warrants moral consideration & a duty of respect, grounded not in instrumental value, but their own right to flourish. Within the broader web of life. So that is why a deep ecological framework is beneficial for space activity by instilling a mode of engagement that is rooted in awe, moral restraint & ethical responsibility urging humanity to approach the cosmos as well as earthly environment, not as a conquerors or consumers but a humble participant with in a broader intrinsically valuable for existence. So in the future space exploration, the collaboration between an astronaut and an ethicist will be essential, something that is not commonly observed today.

- Can cross-culturally accepted ethical principles or guidelines be established to guide global conduct in space activities?

In the realm of astro-ethics, there appears to be an "Ethically pluralistic perspective" or approach. This is because each space research organization is creating its own distinct set of ethical guidelines. So, due to this ethical pluralistic stand in astro-ethics, it is evident that each space research organization regards its own ethical guidelines as both necessary & sufficient. So this "ethical Pluralistic Stand" always indicates "Moral relativism". "Moral relativism" is reflected in the idea that no single ethical system is objectively correct for all; instead, what is considered 'ethical' may vary depending on the organizational context. So it can lead to confusion, conflict, and weakened ethical clarity. For that reason, we should adopt the concept of "universalism' in the context of astro-ethics. Immanuel Kant, John Rawls,& John Stuart Mill all endorse the concept of "Universalism". As per Kant considered that, the categorical imperative is the only valid principle. According to Kant, "Act only according to that maxim you would will to become universal law". Likewise, John Rawl's universalist perspective is based on the principle of justice as fairness. "Justice as fairness" means "A just society should be built on principles agreed upon by individuals in a hypothetical original position behind a veil of ignorance, where they don't know their own characteristics or social status". In the same way, John Stuart Mill upheld "The greatest happiness of the greatest numbers" as the fundamental or universal moral principle. So, this space exploration ought to be guided by a normative framework grounded in a 'Universalist Position'. If, universalist ethical position or stance in astro-ethics were adopted collectively by space research organizations, then it would foster a form of global moral consistency. However, at present, astro-ethics lacks a universally accepted ethical framework.

- Is there any humanitarian law in astro-physical activity?

An anthropocentric perspective or any form of humanitarian law is crucial when engaging in astrophysical activities. This is because, according to Kantian ethics, every astronaut embarking on space exploration must be regarded as an "End" in themselves & possessing intrinsic worth rather than merely as a "Means" to achieve scientific or national objectives. So this perspective aligns with Immanuel Kant's moral philosophy, particularly his second formulation of the categorical imperative: "Act in such a way that you treat humanity, whether in your person or the person of another, always at the same time as an end, never merely as a means". The reason is that every astronaut is a rational moral agent. So we should respect their human dignity. To treat every astronaut as an end in themselves is to affirm their intrinsic moral worth as autonomous agents, deserving of respect not for their utility but for their humanity or personhood. It is a deontological commitment to uphold their dignity, safeguard their well-being, and recognize their role in space exploration as a subject of ethical concern, rather than as a mere instrument of technological progress or geographical interest. However, in the current discussion of astro-ethics, we can see that there is a lack of this humanitarian law or anthropocentric perspectives.

- Is it ethical to spend millions of dollars on space technology without properly identifying various issues that currently exist on our Earth?

In our multicultural society, the persistence of suffering manifests through poverty, unemployment, and inflation, which reflect the deeper structural and existential conditions that challenge the ideals of justice, equity, and human flourishing. So, despite all the problems in our world, can we ethically justify investing millions of dollars in exploring the cosmos while so many pressing human needs remain unmet? Thus powerful nation in our world spends billions of dollars in outer space exploration without addressing fundamental human needs or struggle, it reveals a profound ethical dissonance i.e., "The absence of ethical awareness in a humanitarian context".

According to Rawlsian ethics, justice always demands that societal choices be made in the interest of the least advantaged as a central concern. From this standpoint, criticism of the inappropriate investment in space technology gains moral weight, as such expenditures may divert resources away from addressing the urgent needs of the impoverished & marginalized. So when we viewed through the Rawlsian veil of ignorance, a just society would likely refrain from prioritizing ventures into space over remedying suffering & inequality on earth, as doing so would fail to uphold the principle of fairness & moral impartiality. Diverting vast resources towards space activity without confronting various causes of human suffering, we risk perpetuating violations of Rawlsian principle of justice, because we failing to prioritize the needs of the least advantaged in the distribution of society's benefits. Because – 1. From the standpoint of Rawlsian veil of ignorance, where individuals lack knowledge of their future social or economic position, a just society would be structured to guarantee fundamental rights & essential needs for everyone. Challenging substantial public resources into space exploration, while widespread poverty, hunger, and inequality exist continues to fall short of this ideal. It places abstract goals like scientific prestige or distant knowledge above the urgent & concrete needs of human well-being, 2. Space exploration always tend to serve the interest of educated elites, a dominant nation rather than the broader population. According to the Rawlsian principle, policies should prioritize the needs of the disadvantaged people of our society. Yes, these groups often gain little or no tangible benefit from space exploration. As a result, such investment risk reinforces or deepens existing social & economic inequality, 3. According to John Rawls, inequalities are only justifiable if they lead to a better situation for society's most disadvantaged members. But space exploration or activity does not clearly or consistently meet these requirements. In short, from a Rawlsian point of view, the ethical legitimacy of space exploration is called into question when it takes precedence over or impedes the fulfillment of immediate human necessities. Such prioritization undermines the principle of distributive justice by diverting resources away from the effort aimed at ensuring a fair & equitable allocation of goods & opportunity, particularly for the least advantaged members of our society. So, it becomes evident that allocating millions of dollars to space investigation without addressing the multifaceted roots of human suffering gives rise to a profound ethical void within the humanitarian sphere, i.e., violating the concept of Rawlsian justice. Consequently, this ethical dilemma demands earnest reflection and dialogue between the ethicist and astronaut to reconcile the moral responsibilities.

- Is there no ethical or moral framework in astro-ethics that adequately addresses the phenomenon of Kessler Syndrome?

It is evident that while various astro-ethical frameworks developed by organizations such as ISRO, NASA, and SpaceX tackle a range of astro-physical issues, they remain inadequate in effectively addressing the various challenges posed by the Kessler syndrome. Actually, "Kessler Syndrome" is an idea suggested by NASA scientist Donald J. Kessler in 1978. It describes a situation in low Earth orbit where one collision between satellites or space junk causes more pieces of debris, and those pieces then crash into other objects, creating even more debris. This chain reaction could continue on its own, making space around Earth too crowded & dangerous for future satellite or space missions.

In the realm of philosophy, the discussion of Kessler syndrome raises a variety of ethical problems. If we look at this discussion from the perspective of utilitarianism, then it becomes clear that, according to utilitarianism, any action that leads to such widespread and long-term suffering is morally wrong, because it decreases overall happiness and increases harm. According to utilitarianism, the term "Utility" refers to "An action is morally right that produces the greatest amount of good for the greatest number of people. Yet Kessler syndrome always prevents utility maximization because – 1. It raising the chances of widespread disruption & harm affecting billions of people in our world, 2. Obstructing advancement in science & technology that could benefit the whole mankind in the future. – So Kessler Syndrome always reflects a disposition characterized by the absence of a utilitarian orientation towards outcomes. Similarly, when we analyzed through the lens of Kantian ethics, the Kessler syndrome reveals itself in a new light. According to Kantian ethics, "we must act in a ways that respect others as an end in themselves and follow principles that could be applied universally". However, this Kessler Syndrome violates Kantian ethics in various ways. 1. According to Kantian ethics, we are bound to duty to do what is right, not just what is profitable. Similarly, in the lens of Kessler Syndrome, if managing space debris is very costly or difficult, then Kantian ethics holds that nations have a moral obligation to act responsibly and avoid harm,. So, neglect this responsibility for the saker of the profit or political advantages, then it would be ethically unacceptable. 2. Kantian ethics emphasize that we, always treat others as an ends in themselves, never as a means, similarly in the perspective of Kessler Syndrome, when countries or organizations that use outer space for investigation and create debris without thinking about how it harm others especially for poorer nations & people in the future, actually they treat people as less valuable or as a "means". This goes against Kant's idea that everyone should be treated with equal respect & dignity. So, we can see that this Kessler syndrome is creating a kind of anti-Kantian perspective. Similarly, if we examine this Kessler syndrome from a Rawlsian perspective, then we will see that – 1. According to John Rawls, "Inequalities are justified if they benefit the least advantaged member of society". Similarly in the perspective of Kessler Syndrome, when countries explore or investigate space leave behind lots of debris, making it harder for others, especially poorer nations or future generations to use space. These groups already have fewer resources, so this makes things even more unfair. So it goes against the Rawlsian idea that any advantages should help those who are worst off. 2. According to John Rawls, everyone should have a fair chance to succeed, regardless of background. Similarly, in the lens of Kessler Syndrome, space debris produced by rich countries might stop poorer nations from being able to use or gain anything from space in nature. It blocks fair opportunity and reinforces global inequality. 3. According to John Rawls, a fair society should be designed from the 'veil of ignorance', where no one knows their position in our society, and policies should benefit the least advantaged. Similar in the lens of Kessler syndrome, - if present pattern of space exploration impose lasting harms, particularly on future generations or less advantage nation, actually they contravene Rawls principle of justice, which demands that social arrangements always prioritize the wellbeing of the most vulnerable and be justifiable from behind a veil of ignorance. – Therefore, this Kessler Syndrome expresses a kind of anti-Rawlsian viewpoint.

So, in the light of the foregoing analysis, the multifaceted ethical deficiency within astro-ethics have been compellingly articulated.

Conclusion:-

This article endeavors to elucidate the foundational principle of astro-ethics, and articulate the ethical framework that governs humanity's engagement in he cosmos. Similarly, this article examines various gaps or lacunae in the discussion of asto-ethics, drawing upon various philosophical viewpoints. So I have explained this in philosophical terms as "ethical Deficiency". Consequently, this exploration of astro-ethics represents a novel frontier in contemporary philosophical discourse, presenting significant challenges as it seeks to interpret and integrate diverse philosophical perspectives into our understanding of humanity's ethical responsibilities in the cosmos. So, astro-ethics is an emerging topic in philosophy because it

examines the moral and ethical implications of human activities in outer space. So, the discussion of astro-ethics within philosophy is beneficial because it pushes us to think about what is right and what is wrong beyond just Earth, considering how our actions in space might affect other planets and possible life forms.

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