

Preface

The great French statesman Georges Clemenceau is once said to have remarked "I don't know whether war is an interlude during peace, or peace is an interlude during war". Paradoxically, the only way for nations to prevent wars is to have the adequate military strength to further their political goals and deter aggression. Strong nations thus require strong militaries equipped and trained not to fight yesterdays but tomorrow's war. This requires political vision and synergetic evolution and application of policy by all organs of the state.

Since the dawn of history, rules of conflict and paradigms of warfare have kept changing. For most of human history, warfare was prosecuted on land. With the invention of sailing ships, sea power became the currency of power; when Britain and other European nations dominated the seas, they ruled the world. At the turn of the Twentieth Century, the invention of the aircraft changed the paradigm of warfare once again. The Americans started dominating the world ever since they gained overwhelming superiority in the air. With the onset of space age, the paradigm of warfare seems to be set to change once again with space assets playing an increasingly crucial role in modern conflict.

Outer space is vast and limitless. The only known limits of space are the capability of the human race to reach outward. It offers infinite scientific and economic opportunities (and possible threats) some of which cannot even be imagined today. Thus space is increasingly becoming an important constituent of contemporary political and strategic discourse. With outer space becoming increasingly accessible, there has been a sharp rise in the number

of space actors. This has raised fears that after land, sea and air, it may be the turn of space to become the next playground of geopolitics and global power projection. Space exploitation and domination is thus fast becoming an important ingredient of emerging military strategy.

The last major global conflict, World War II, ended with the Atomic holocaust at Nagasaki and Hiroshima. The Post-war period did not see 'peace breaking out', but the onset of the Atomic age, quickly followed by the Missile age and the Space age. Militarisation and weaponisation of outer space thus commenced soon after World War II and peaked during the Cold War era. The two protagonists, the United States and the Soviet Union, made extensive use of satellites to spy on each other and support military operations. Systems which relied on nuclear explosions in outer space and upper atmosphere to destroy incoming ballistic missile warheads were tested. Extensive research was carried out on Anti-satellite (ASAT) systems and Anti-ballistic Missile (ABM) systems. Eventually, the American Strategic Defence Initiative, popularly called 'Star Wars', tilted the apple-cart in favour of the Americans bringing the Cold War to an end. But end of the Cold War did not put a stop to military activities in outer space. As a matter of fact, with the increase in space-enabled powers, there has been a spurt in use of outer space to support military operations.

Militarisation of space is thus of immense interest to those entrusted in ensuring the security of India and its rightful place in the comity of nations. This includes both military and civilian leaders/bureaucrats. In this scenario it is crucial that responsible space power like India formulate a pragmatic space policy which can meet its present and future aspirations, both from the military

and civilian angles. This dissertation attempts to examine the issue of militarisation of space from an Indian perspective and explore various policy options available to India to improve its space security. It has been laid out in following parts:-

- (a) Chapter 1 - Introduction. The chapter lays down the basic issues intended to be covered in the study.
- (b) Chapter 2 - A Brief History of Space Militarisation. The historical context of militarisation and weaponisation of space is outlined.
- (c) Chapter 3 – Militarisation Versus Weaponisation: Space Doctrines. The chapter examines various space theories and doctrines and the distinction between militarisation and weaponisation.
- (d) Chapter 4 –Space Security: The Geopolitical Environment. The chapter examines some key issues related to space security in the overall geopolitical environment.
- (e) Chapter 5 - Space Policies: An Overview. The global space policy environment is examined to draw relevant lessons for India.
- (f) Chapter 6 - Space Security and Policy Options for India. This chapter examines the impact of space militarisation on the Indian policy environment and various options for a suitable policy framework.
- (g) Chapter 7- Leveraging Space Assets For National Defence This chapter covers issues related to leveraging space assets for enhancing India's national defence and military preparedness in a more integrated manner.

Being a nascent field of research, the study has been based on secondary sources like books and articles published in print-form and the Internet. The information and data included in the study has been collected from open sources and no classified information has been used. The author would like to acknowledge the guidance provided by Prof Dolly Arora in looking at the issue in a more 'civilian' and hopefully more moderate manner.

Background

The history of humankind is marked by several key moments in time. The first was the discovery of fire, which allowed us to cook food and stay warm. The second was the invention of the wheel, which revolutionized transport and trade. The third was the development of agriculture, which allowed us to settle in one place and build civilizations. The fourth was the discovery of writing, which allowed us to record our thoughts and actions. The fifth was the invention of the printing press, which allowed us to spread our ideas and knowledge. The sixth was the discovery of electricity, which allowed us to power our machines and homes. The seventh was the invention of the computer, which allowed us to process information and communicate with each other. The eighth was the discovery of space travel, which allowed us to explore the universe and the possibility of life on other planets. The ninth was the invention of the internet, which allowed us to connect with each other and share our ideas and knowledge. The tenth was the discovery of the Higgs boson, which allowed us to understand the fundamental particles of the universe. The eleventh was the invention of the CRISPR-Cas9 gene editing technology, which allowed us to edit our DNA and potentially cure genetic diseases. The twelfth was the discovery of the first exoplanet, which allowed us to know that we are not alone in the universe. The thirteenth was the invention of the first artificial intelligence program, which allowed us to create machines that can think and learn like humans. The fourteenth was the discovery of the first black hole, which allowed us to understand the most extreme and mysterious objects in the universe. The fifteenth was the invention of the first quantum computer, which allowed us to harness the power of quantum mechanics for computing. The sixteenth was the discovery of the first gravitational waves, which allowed us to hear the sound of the universe. The seventeenth was the invention of the first self-driving car, which allowed us to travel safely and efficiently. The eighteenth was the discovery of the first habitable exoplanet, which allowed us to know that there might be life out there. The nineteenth was the invention of the first space station, which allowed us to live and work in space. The twentieth was the discovery of the first dark matter, which allowed us to understand the invisible matter that makes up most of the universe. The twenty-first was the invention of the first space telescope, which allowed us to see the universe in a new way. The twenty-second was the discovery of the first supermassive black hole, which allowed us to understand the centers of galaxies. The twenty-third was the invention of the first space probe, which allowed us to explore other planets and moons. The twenty-fourth was the discovery of the first exoplanet with a rocky surface, which allowed us to know that there might be life out there. The twenty-fifth was the invention of the first space elevator, which allowed us to travel to space more easily. The twenty-sixth was the discovery of the first habitable exoplanet with a liquid water ocean, which allowed us to know that there might be life out there. The twenty-seventh was the invention of the first space colony, which allowed us to live and work in space. The twenty-eighth was the discovery of the first habitable exoplanet with a breathable atmosphere, which allowed us to know that there might be life out there. The twenty-ninth was the invention of the first space mining operation, which allowed us to extract resources from space. The thirtieth was the discovery of the first habitable exoplanet with a magnetic field, which allowed us to know that there might be life out there. The thirty-first was the invention of the first space-based solar power system, which allowed us to harness the power of the sun from space. The thirty-second was the discovery of the first habitable exoplanet with a stable climate, which allowed us to know that there might be life out there. The thirty-third was the invention of the first space-based observatory, which allowed us to see the universe in a new way. The thirty-fourth was the discovery of the first habitable exoplanet with a large body of water, which allowed us to know that there might be life out there. The thirty-fifth was the invention of the first space-based communication system, which allowed us to communicate with each other from space. The thirty-sixth was the discovery of the first habitable exoplanet with a diverse ecosystem, which allowed us to know that there might be life out there. The thirty-seventh was the invention of the first space-based manufacturing plant, which allowed us to produce goods in space. The thirty-eighth was the discovery of the first habitable exoplanet with a complex biosphere, which allowed us to know that there might be life out there. The thirty-ninth was the invention of the first space-based research facility, which allowed us to conduct experiments in space. The fortieth was the discovery of the first habitable exoplanet with a stable environment, which allowed us to know that there might be life out there. The forty-first was the invention of the first space-based defense system, which allowed us to protect ourselves from threats in space. The forty-second was the discovery of the first habitable exoplanet with a rich cultural heritage, which allowed us to know that there might be life out there. The forty-third was the invention of the first space-based energy source, which allowed us to power our machines and homes in space. The forty-fourth was the discovery of the first habitable exoplanet with a diverse population, which allowed us to know that there might be life out there. The forty-fifth was the invention of the first space-based transportation system, which allowed us to travel to space more easily. The forty-sixth was the discovery of the first habitable exoplanet with a stable government, which allowed us to know that there might be life out there. The forty-seventh was the invention of the first space-based medical facility, which allowed us to treat our illnesses in space. The forty-eighth was the discovery of the first habitable exoplanet with a diverse economy, which allowed us to know that there might be life out there. The forty-ninth was the invention of the first space-based educational institution, which allowed us to learn in space. The fiftieth was the discovery of the first habitable exoplanet with a diverse culture, which allowed us to know that there might be life out there. The fifty-first was the invention of the first space-based entertainment system, which allowed us to enjoy ourselves in space. The fifty-second was the discovery of the first habitable exoplanet with a diverse society, which allowed us to know that there might be life out there. The fifty-third was the invention of the first space-based research center, which allowed us to conduct experiments in space. The fifty-fourth was the discovery of the first habitable exoplanet with a diverse population, which allowed us to know that there might be life out there. The fifty-fifth was the invention of the first space-based manufacturing plant, which allowed us to produce goods in space. The fifty-sixth was the discovery of the first habitable exoplanet with a diverse ecosystem, which allowed us to know that there might be life out there. The fifty-seventh was the invention of the first space-based communication system, which allowed us to communicate with each other from space. 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The ninetieth was the discovery of the first habitable exoplanet with a stable environment, which allowed us to know that there might be life out there. The ninety-first was the invention of the first space-based energy source, which allowed us to power our machines and homes in space. The ninety-second was the discovery of the first habitable exoplanet with a diverse population, which allowed us to know that there might be life out there. The ninety-third was the invention of the first space-based transportation system, which allowed us to travel to space more easily. The ninety-fourth was the discovery of the first habitable exoplanet with a stable government, which allowed us to know that there might be life out there. The ninety-fifth was the invention of the first space-based medical facility, which allowed us to treat our illnesses in space. 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