

SWOT Analysis of Pakistan's Space Program

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Abstract

Outer space in Pakistan is a trivial notion, and the idea has become less concerning for the authorities let alone the general masses. For decades, this field has been void of any particularly outstanding and significant development in the country with only a handful of satellites launched in outer space. Where the world has progressed in space technology utilizing it for exploring, exploiting, and now even racing to dominate the global common, that is the outer space, Pakistan's space program has been lagging and misses the opportunities that a robust outer space program provides, all the while ignoring the threats that arise from a weak space program. The significance of outer space has increased over the years in both civilian and military domains, where militarization outer space is now being transformed into a weaponization phenomenon. The space race that began in the Asian region with the Soviet Union inspired periphery states such as Pakistan to join space faring. Pakistan was the third country in Asia to establish its space agency; however, over time, it has lost its acclaimed position. Over time, it has grown weak with minimal research and development (R&D) in the field. Pakistan's space program lacks a place in the literature, and academic discussions and this study aims at filling that gap by analyzing the strengths, weaknesses, threats, and opportunities for the space program of Pakistan.

Keywords

Pakistan, India, security, outer space, SWOT analysis, SUPARCO

Introduction

Outer space is gaining strategic significance for competition with time among not only the world powers but regional powers as well. In recent times, this global common has increasingly gained popularity among the developing states pertaining to its multidimensional significance in academics, science and technology, and security aspect. Access to space has become relatively easy in terms of technology; however, it is still an expensive venture to achieve, which requires an amalgamation of both sound technology and a robust and stable economy. In order to obtain maximum benefit from outer space, it is essential to devise strategies and policies that may strengthen the space program. Space programs are formulated to help explore the outer space and develop the technology required to carry out these programs. Among South Asian states, Pakistan was the first country to formulate its space program;

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however, it has had relatively slow-paced progress, which has put it behind by many folds in the regional and global space race. Space race has enhanced the global importance of the domain. In a short time, the world's approach towards outer space has changed altogether. The exploration has shifted to the paradigm of exploitation of outer space and its resources. This exploitation has rendered the global security vulnerable, with states like India and Pakistan becoming space-faring states as both poses a hostile nature towards each other, which jeopardizes their mutual relations and has adverse impacts on the regional peace and stability. The fast-track advancement of space technology in the military domain by India has already created an imbalance in the capabilities of both countries. Owing to the assessment of the looming threats for false flag operations within these circumstances, the security of outer space in the future must be sought after. The regional security dynamics of South Asia have more potential for facing direct threats in this scenario. Subsequently, India's ambitions to militarize and weaponize outer space threaten the national security of Pakistan.

This paper will review the progress of Pakistan's space program. The foreground is set on the phases of the space program that cover different eras in the R&D of Space and Upper Atmosphere Research Commission (SUPARCO). The paper is based on the primary data collected through semi-structured interviews from national experts, academics, and practitioners associated with outer space in Pakistan. It overviews the space program of Pakistan, highlighting the strengths and weaknesses of the program. The paper explores the threats and opportunities offered by the space program to Pakistan, via the SWOT analysis. The paper highlights the strengths and weaknesses in terms of an academic basis, lack of technology, and financial resources. The paper will assess the threats faced by Pakistan. It will also explore the opportunities to strengthen Pakistan's space program further through indigenous developments and the feasibility of international collaborations.

Pakistan's Space Program

Dr Abdus Salam, a world-renowned physicist and Pakistan's first noble laureate, was the pioneer of Pakistan's space program (Mehdi & Su, 2019). He conceived the idea of an institution that can cater to the strategic and modern scientific needs of the state. Dr Salam was determined to strengthen the strategic basis of the country and established the Pakistan Atomic Energy Commission (PAEC) in 1956 (History). He understood the strategic and scientific importance of outer space as well and initiated the space program under the umbrella of PAEC in 1961. Under the brilliance of his faculties, Pakistan became the third country in Asia to launch an ambitious space program. Space and Upper Atmosphere Committee was established under the auspices of PAEC as its parent organization, which was later recognized as an autonomous body in 1964 (Kingwell, 2014). However, SUPARCO became the successor institute of this committee that dealt with the research and development in the field of outer space (Ibid).

Owing to the strategic significance of outer space, the status of this commission was once again changed from the autonomous body and was placed under the direct command of the Strategic Planning Division (SPD) (Ali & Khan, 2019). Since Pakistan has lagged in the indigenous capabilities of space technology, the United States assisted in initiating the space program. US-supported in the launch of sounding rockets such as Rehbar- I and Rehbar-II in 1962 (Mehmud, 1989). In 1961, when Pakistan perceived the idea of exploring the outer space, US President John F. Kennedy announced his ambition of landing on the moon (Mehdi & Su,

2019). This mission required knowledge and information of the upper atmosphere exceeding the stratosphere and the Indian Ocean provided a suitable environment to collect this data. Pakistan seized this opportunity and offered to join the National Aeronautics and Space Administration (NASA) with their data collection (Mehdi & Su, 2019). With the US and NASA's support of rocket launching, Pakistan's scientists mastered the launching capability, which began with sending sounding rockets in the 1970s (Amhed Bilal, 2019).

Trajectory of SUPARCO

The history of SUPARCO is sinusoidal and had its complications. The history of Pakistan's Space Program is categorized in three phases, where Phase I is almost thirty years, 1961-1990, Phase II is from 1991-1999 and finally, the period of 2000-2012 is Phase III (SUPARCO).

During this era, SUPARCO focused on understanding the working of space and space assets, R&D of sounding rockets and satellites. In this period, Pakistan set up the space commission, mastered the engineering of sounding rockets, and launched its first indigenous satellite Badr-A, also known as Badr-I (Amhed Bilal, 2019). During this phase, SUPARCO set up research labs and ground stations at Lahore and Islamabad. The Satellite Ground Station (SGS) and Satellite Research and Development Centre for Communication Satellite (SRDC) were established at Islamabad and Lahore, respectively (SUPARCO).

The second phase of the ten years (1990-1999) began with the R&D of the second satellite of Badr program, named Badr-B. However, there was a hiatus in the R&D during this time in the field of outer space was decreased for a very long time. The second phase mainly incorporates research of Remote Sensing Technology, which had begun in 1973, and only one satellite was launched during this era, with borrowed satellite imagery technology. (Mehmud, 1989; Amhed Bilal, 2019).

The third phase, in 2000, began the revival of the dormant status of Pakistan's space agency. The authorities recognized the need to increase expertise in the field and that SUPARCO must be brought at power with the leading space agencies. The third phase of the space program focused on the launch of Badr-B and Paksat-1, which led to Design and Development (D&D) and the launch of Paksat-1R in 2011. Along with the development and launching of satellites, the authorities directed their attention towards the capacity building and facility enhancement at the SGS (SUPARCO).

Pakistan launched two satellites through the Chinese Jiuquan satellite launch centre in 2018 according to the space vision. PRSS-1 is Pakistan's first Remote Sensing Satellite that will mainly serve the purpose of monitoring of CPEC projects. The other satellite launched was PakTES-1A that is an indigenously developed satellite by the SUPARCO (Mehdi & Su, 2019).

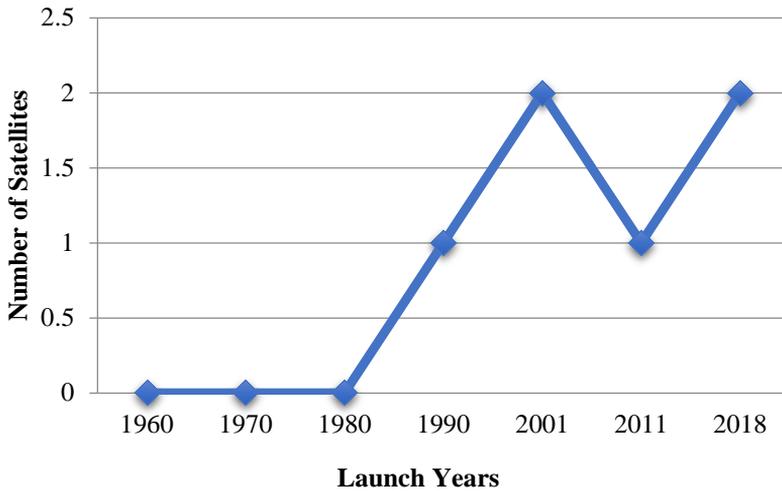


Figure 1: Trajectory of SUPARCO’s Progress

Satellites by Pakistan

Pakistan has managed to launch six satellites; however, the gap between the first launch of rockets and the launch of satellites is very alarming. Pakistan launched the first satellite Badr-1 in 1990, after a daunting gap of thirty years (Mehmud, 1989). The indigenously made satellite was launched from the Chinese Long March-2E launcher. It was an artificial satellite launched for experimental purposes, with a lifetime of fifteen years. The second satellite again took a decade to launch. Badr-B/Badr-2 launched 2001, was a Russian Zenith-2 Rocket with only two years of shelf life. It was more sophisticated than the Badr-1 and had a (Charged Coupled Device) CCD camera, which took pictures of the Earth (BADR-B). The system allowed ground stations to change the direction of satellite in space. In the same year, the PAKSAT-1 was launched (Mehdi & Su, 2019). The Turkish satellite, which was earlier used by Indonesia as well, was a communication satellite leased to Pakistan. This satellite was launched to retain the slot provided to Pakistan by the International Telecommunication Union (ITU).

It took yet another decade for Pakistan to launch PAKSAT-1R, which was launched in 2011, into the geostationary orbit (Ali & Khan, 2019). Pakistan used Chinese launcher CZ-3B to launch PAKSAT-1R, which replaced PAKSAT-1 that was launched earlier. However, it took another eight years for Pakistan to launch more satellites. In July 2018, Pakistan launched PRSS-1 and PakTES-1A, where PakTES-1A is an indigenous effort of Pakistan (Amhed Bilal, 2019). Apart from these satellites, Pakistan also owns an iCube satellite that was a project of the Institute of Space Technology (IST) (SUPARCO). IST is an educational institution affiliated with the SUAPRCO. These satellites are very less in terms of quantity and quality as compared to the other states in the region that started many years after Pakistan’s space program.

National Space Policy and Regulatory Framework

The space program of Pakistan lacks direction despite a national space policy, a national regulatory framework on outer space activities, and a space vision. The national space policy highlights a direction for space activities under a statutory framework, which is currently missing, as Pakistan has not formulated any national legislation for space activities (Din & Butt, 2020). The incoherence among the three main documents has disrupted achieving sustainable goals in outer space. Pakistan's national policy addressing the outer space activities focuses on the authoritative body that will overlook the design, manufacturing, and the procurement of satellite technology in Pakistan (Khan, 2014). The regulatory body will also be responsible for issuing the license to operate satellites and maintaining the national registry of space objects. It will manage the regional and global cooperation of Pakistan regarding the outer space. The regulatory authority will devise a framework for the space sector, focusing on the peaceful utility of outer space assets. According to the policy, the development of space assets for civil use of space technology and applications will be in collaboration with the civil space sector. The national framework currently focuses its attention on an understanding of space laws, policy, and regulatory issues at the national and international levels.

Table 1: Pakistan's satellites launched in outer space

No.	Satellite	Launch Date	Function carried out by Satellite
1	Badr-1	16 July, 1990	Experimental and Educational Purpose
2	Badr-B	10 December, 2001	Experimental Purpose
3	PakSat-1	December, 2001	Communication satellite used for tele-medicine and tele-education
4	PakSat-1R	11 August, 2011	Geosynchronous and Communication satellite that replaced the PakSat-1 satellite
5	PRSS-1	9 July, 2018	Dual purpose remote sensing satellite used for earth observation and optical satellite
6	PakTES-1A	9 July, 2018	Technology Evaluation Satellite-remote sensing

Pakistan's Space Vision

The outer space has become significant to the global players in the modern world due to the technical advancement of the command, control, and communication. It broadens the horizon of capabilities for any state in the world with the dual-purpose utility, including civilian and military use. Pakistan is all set to advance as an ambitious space-faring state with its space vision. Space vision was initially named Pakistan's Space Program (PSP) -2040, which was approved by the then Prime Minister Yousuf Raza Gilani. However, it was later renamed to Space Vision (Official, 2019). The main aim of the space vision is that the people of Pakistan must benefit from space technology. This can be done by utilizing outer space capabilities for socio-economic and defence purposes. Currently, Pakistan uses space technology

for socio-economic purposes, including agriculture, communication, meteorology, and aeronautics.

The 'space vision' focuses on the functions of the operational framework (Shah, 2012). According to the vision, Pakistan will develop and launch five Geostationary satellites and six Low Earth Orbit (LEO) satellites (Shah, 2012). The details of the space vision have been kept confidential as Pakistan treats its space program as a national security concern with the growing strategic significance of outer space. This space vision will prove to be a guide for Pakistan to regain its outer space autonomy and counter the threats it faces from the adversaries with a unidirectional approach.

SWOT Analysis of Pakistan's Space Program

The space program has gained strategic significance in Pakistan over the years, given the military ambitions of its adversary. The growing strategic significance of the outer space has prompted Pakistan to resurrect its vulnerable space program. A secure space program and investment in space technology is a need of the hour for the country. To achieve this ambition, a strategy build-up must be initiated at the grass-root level starting from the strengthening academic foundations as a part of space technology, and space policy as the space vision of Pakistan's space program provides an institutional framework for the future.

Establishing a reliable and effective space program for Pakistan has become a necessity as the international and regional outer space activities have gained momentum over the last few years. The analysis of the strengths, weaknesses, opportunities, and threats provide a definitive outline for more sustainable strategies for the advancement and reinforcement of the space program. It is crucial to identify these characteristics for the space program to incorporate them into the space policy. With regards to the strengths, education has the foremost significance in the growth of any research and development institution. It plays an essential role in the strengthening of the space program. Education provides for the technical and non-technical pool of experts and specialists. It will help in formulating a robust Human Resource (HR) and contributing to capacity building.

Furthermore, there are two ways to enhance the capacity; to increase the commercial use of space capabilities and to employ outer space assets for military purposes as well, with the dual-purpose technology. The latest development of PRSS-1 serves the interest of commercial and strategic users for high-resolution imagery (Pakistan Remote Sensing Satellite).

As far as weaknesses are concerned, Pakistan lacks the coherence of institutions that are required to strengthen the space program. There are separate public and private institutions that exist in their segregated capacity (Amhed Bilal, 2019). The collaboration among these institutes is challenging to achieve in the absence of national space legislation, weakening the progress of the space program. The gap in collaboration also widens due to weak economic and technical foundation, as outer space experimentation remains an expensive venture requiring high-end technology.

In view of the above, it is essential to acknowledge that the strategic aspect of warfare has shifted from kinetic to non-kinetic and unconventional methods, amidst of which outer space has emerged as a new security challenge for the international community. The significance of this domain in South Asia has increased in the last few years. South Asian states are using outer space like other states in any other region for militarization (Riaz, 2019). India heavily militarizes the region in

every aspect, which is now reaching outer space as well. It has emerged as a space power with the Anti-Satellite (ASAT) test, and it should be taken into account that as an adversary with hostile relations, India's ambitions will always be directed towards Pakistan. The development of an effective space program, with defensive counter capabilities, has become a national security emergency for Pakistan.

Pakistan is on the path of reviving its space program, which allows it to engage domestic and international institutes for various collaborations. The educational institutions-industry synergy is one of many options that provide opportunities to enhance the capacity of space programs. It is from this synergy that new and innovative ideas will emerge and small, testing satellites like the iCube satellite can be designed, developed, and launched indigenously or through international collaborations.

Strengths and Opportunities

The space program offers multiple opportunities for Pakistan, domestically, and internationally. The private-public partnership at national and international level is an opportunity to encompass the strengths at different levels.

Strong Academic Foundation

The higher studies in Pakistan offer many subjects that collectively contribute to space technology and the development of satellites (Riaz, 2019). The engineering universities across the country are offering specialization in Material Sciences and Engineering, Nano-technology, Electronics, Avionics, Aerospace, Data-Imaging, and Signal Processing, which contribute to the satellite and space assets development. However, only a few dedicated higher education institutions offer academic expertise in space sciences and technology. In Pakistan, only three universities offer the subject of Space sciences and only two of them offer specializations in space sciences that too as non-engineering courses. Whereas, the social research related to space militarization and strategic significance of outer space is only taught in the one university of Pakistan, Air University Islamabad at the department of Aerospace Science and Strategic Studies.

The departments of space sciences in Pakistan are educating hundreds of students that are graduating with expertise in the space sciences and technology; they are employed in the different organizations, domestically and internationally (Dr. Javed Iqbal, 2019). These educational intuitions have industry linkages that yield better-equipped scientists and engineers who have firsthand experience of the latest technology that is employed worldwide. These students are not only working as interns and fellows at the government institutions such as SUPARCO but in international organizations like UAS-global, which is Pakistan's first and only authorized UAV provider for civil and military purposes. These private organizations provide experience and exposure to the students in aviation but not in satellite technology and outer space dynamics.

Table 2: Subject of Space Sciences offered in Pakistan

Sr. No.	Field of Study	Institute
1	BS Space Sciences	Institute of Space Technology, Islamabad
2	BS Space Sciences	Punjab University, Lahore
3	M.Sc. Space Sciences	Punjab University, Lahore
4	MPhil. Space Sciences	Punjab University, Lahore
5	PGD Space Sciences	Punjab University, Lahore
6	B.Sc. (Hons.) Space Sciences	Karachi University, Karachi
7	MSc. Space Sciences	Karachi University, Karachi
8	MS Space Sciences	Karachi University, Karachi
9	PhD Space Sciences	Karachi University, Karachi

Capacity Building

The military utilization of outer space is inevitable. Pakistan must realize the severity of the changing dynamics of this domain. He is of the view that Pakistan should develop a program that is capable of incorporating dual-use capability- civilian and military. It will not only strengthen the country’s defence but will also contribute to the state’s economy. However, the country faces a lapse of technical expertise. Pakistan launched its first Remote Sensing satellite in 2018 despite SUPARCO initiating a dedicated division for Remote Sensing Research in 1973 (Mehmud, 1989). It evidently manifests the slow-paced progress of Pakistan’s Space Program that took almost forty years to develop its technical research into a final product.

Development of Dual-use Satellites

The space vision of Pakistan has provided a framework for developing geo-stationary satellites that will be beneficial in the socio-economic domain. As military utilization of outer space and its assets is inevitable in the modern age, Pakistan should invest in the development of dual-purpose satellites. Currently, Pakistan employs its PRSS satellite for dual purposes. Space technology used for imagery and communication must be indigenous and developed to address the security threat in the short term. In the meanwhile, the peaceful purposes of the space technology, in the long run, will be beneficial for the state to progress. Pakistan must have strong defensive space policy and technology to counter the threat that looms in the region. The dual-purpose satellites will provide new avenues for the progress of the space program and the SUPARCO. The commercial use of satellites will generate revenue that will help achieve a rather expensive goal.

International Collaborations

Pakistan has become the closest ally of China in its latest strategy of emerging as a soft power with the Belt and Road Initiative (BRI). It has placed various national and regionally significant projects under the umbrella of China–Pakistan Economic Corridor (CPEC). Space vision and the renewed space policy of Pakistan are also noted as a part of this mega multi-billion investment project that helped Pakistan to launch two satellites. However, China cannot be Pakistan’s only option for

international cooperation. Previously, Pakistan has launched satellites in collaboration with Turkey, which is an option that can always be explored. Nevertheless, these are not the only available choices, and Pakistan must consider alternative collaborations to enhance its horizon. The states that have successfully launched their space programs like France and Japan can become potential collaborative partners (Official, 2019). Pakistan is also moving towards improved strategic relations with Russia and given the increased military cooperation in mutual relations as well as the regional-Shanghai Cooperation Organization (SCO) - it must incorporate the development of space program (Official, 2019).

Threats and Weaknesses

Regionally, the outer space dynamics revolve around two states of China and India, where India is regionally competing with China yet pursuing Pakistan as a soft target. This competition has had adverse effects on Pakistan's national security. Considering the arms race in outer space as a national and regional security threat, the paper moves on to discuss the regional and national security threats that emerge due to the militarization of outer space. The imbalance of outer space capabilities in this age can be challenging for a state like Pakistan. Pakistan has to not only secure its territory but also maintain the deterrence for its own peace to prevail.

Lack of Facilities and Defense Strategies

Pakistan's vulnerable defences against the state of the art space assets of the adversary integrated with C4ISR capabilities empowering it with the Space Situation Awareness (SSA) increases Pakistan's defenselessness in outer space (Mansoor, 2018). The lack of counter strategies and the security tactics of the ground assets highlight the weaknesses of the space program. The development of defensive strategies to secure space assets, ground facilities, and monitor the space activities of the adversary must be the mission statement of the space program that is mainly providing defensive capabilities. The lack of facilities and space labs has caused a gap in the research, design, and development of launching facilities, ground, and space assets as exploring the outer space requires space assets supported by ground facilities.

The national awareness about the significance of the growing space militarization is the need of the hour. Pakistan's adversary, India, is capable of monitoring the activities even in the darkest of nights and given the circumstances, the priority of safeguarding strategic assets must be treated as an urgent matter and a national concern (Mujadid, 2019). India has developed the geo-stationary satellites that are used for monitoring and are capable of providing inter and intra-communication continually. Over years, there have been additions to the reconnaissance satellite series of RISAT, Cartosat and GSAT military dedicated satellites (Zahid & Qaiser, 2019). The Cartosat-2E satellite and the RISAT-2BR1 have been termed as the 'eye-in-the-sky' and 'spy-satellite', respectively (India Today, 2019). The increase in reconnaissance satellites that are capable of providing real-time data and information weakens the defences.

Regional Security Threat

Addressing outer space development as a national security emergency requires addressing the threat along with the military lines. Regional security is currently at stake due to the two technically most advanced states of China and India are competing for an arms race in outer space. The relationship equation of Pakistan, India, and China has created complex regional security, with China and India being

the prominent players of outer space and Pakistan being a significant regional power. The offensive-defensive power nexus among these states transforms the security trilemma in outer space (Khan & Khan, 2019). India has openly admitted to its military ambitions in outer space ever since China acquires ASAT capability (Arif & Qaiser, 2017). Since the Kargil war of 1999, India has realized the importance of space technology and openly admitted to employing it for military purposes (Defence M. o., 2017).

India tested its Anti-satellite (ASAT) capability in March 2019 (Times of India.com, 2019). India has always centred its acquisition of military stockpile towards out-growing Chinese military ambitions (Rajagopalan, 2011). However, historically their military aggression has always directed towards Pakistan. After China tested its ASAT capability, India maintained a contradicting approach towards the militarization of outer space (Rajagopalan, 2011). On the one hand, the political leadership and civil bureaucracy maintained the stance of the peaceful utility of outer space while the military hierarchy stressed the importance of a countermeasure. Within three years, their ambitions on the militarization of outer space became visible.

In 2010, the integrated Defence Staff of HQ stated in a policy document, "India will develop anti-satellite weapons 'for electronic and physical destruction of satellites in both LEO and GEO-synchronous orbits'. On another occasion, the chief of DRDO and the scientific advisor to the defence minister, V.K. Sarawat, commented, "India has begun the development of ASAT capability". In February 2011, at the press conference after the test of Agni-III, Sarawat referred to the test as India's anti-satellite capability. He validates the simulation of anti-satellite technology on the ground at the same occasion. Similarly, the president of India, APJ Abdul Kalam has also boosted the anti-satellite technology of India on the Golden Jubilee celebration of DRDO stating that it has the capability of intercepting and destroying any spatial object within the radius of 200 km (Rajagopalan, 2011). After projecting its ambitions to the world, India realized its ambitions of militarizing outer space after nine years and conducted a successful ASAT test on 27, March 2019.

National Security Threat

The significance of outer space in South Asia has increased in the last few years. South Asian states are using outer space like other states in any other region for militarization. The achievements that India has made in this domain have shifted the geostrategic paradigm of the region. India holds close collaborations with the United States and Israel for technical assistance and acquiring upgraded assets (Sarosh, 2019). It has realized the significance of outer space and employing all the capacities to closely monitoring its adversary.

The development of ASAT capability by India will have global and regional impacts on multiple fronts. It claims to be competing with China to counter it in outer space, but this progress can have a devastating effect on Pakistan in the future. Pakistan should be able to foresee the threats that this aggressive advancement can have on the country and develop a multi-fold program (Riaz, 2019). Military utility and militarization of outer space are inevitable. A space program must be capable of incorporating the dual-purpose utility of space assets and ground facilities, as military and commercial purposes are beneficial for each other (Riaz, 2019). India has attained a dual-use capability of space assets as for them; it is a matter of prestige rather than national security (Official, 2019). This ASAT test has made India capable of challenging China, but it will have a tertiary impact on Pakistan.

Conclusion

Conclusively, the paper has provided an overview of the phases of Pakistan's Space Program and a SWOT analysis. The SWOT analysis played a vital role in identifying the strengths, weaknesses, opportunities, and threats associated with the space program of Pakistan. The paper highlighted that the strength of space programs for Pakistan lies in the increase of training and education of the space sciences graduates in the professional environment. It can be made possible with the synergies of educational and professional institutions. The students must be motivated to perform R&D within the resources available at the educational institutions in order to increase the feasibility of the indigenous development of space assets. These opportunities can be provided with the private-public collaboration, which will further enhance the capacity building in the field of space sciences, where the introduction of a student satellite program in educational institutions, launched by SUPARCO, is a step forward in this direction. The international partnerships also offer alternatives and opportunities for technology and development collaborations as highlighted.

The paper also highlighted the weaknesses in the lack of indigenous development, limited focus on the subjects of space sciences and engineering, lack of defensive strategies for outer space, and inadequate attention towards the international collaboration for transfer of technology and the research and development in the field of outer space. The lag of R&D has weakened the progress of the space program, which led to the emergence of national and regional threats vis-à-vis outer space in South Asia. The lack of C4ISR and SSA capabilities possessed by Pakistan's adversary makes the tactical and strategic ground assets vulnerable. Pakistan lacks counter strategies for outer space that may provide safety and security in case of an unfortunate event. Along with the strategy is the absence of space assets and relevant ground facilities that further weaken the space program and threaten the national security of the country. Moreover, a vulnerable space program of Pakistan and the absence of deterrence in outer space further threatens the fragile strategic stability of the South Asian region.

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