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Pakistan; Pluto of the Space Race

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Abstract

Space law is an essential component of regulating activities in outer space and ensuring responsible exploration and utilisation of space resources. This policy brief provides an analysis of space law in Pakistan. The examination highlights strengths and weaknesses in Pakistan's current space law and offers policy recommendations to bolster its space programme. By addressing the existing gaps and aligning with international best practices, Pakistan can optimize its space capabilities and foster international collaboration in the realm of space exploration.

Key Words: Space law, Pakistan, SUPARCO, Development, Vacuums

I) Introduction

Space exploration and research have emerged as vital areas of scientific and economic development, prompting countries worldwide to invest in space technologies and regulatory frameworks. The "Space and Upper Atmosphere Research Commission (SUPARCO) Act 1961" serves as the primary legal instrument governing space activities in Pakistan, outlining the mandate and functions of the Commission.

II) Space Law in Pakistan: SUPARCO

SUPARCO Act holds immense significance as the foundational legislation that established Pakistan's space agency and provided the legal framework for space research and development in the country. Enacted during a critical period of global space exploration, the SUPARCO Act set in motion Pakistan's journey into space and remains a vital instrument guiding the nation's space activities.

History of SUPARCO

The SUPARCO Act, enacted on September 7, 1961, marked the formal establishment of the Space and Upper Atmosphere Research Commission. It was founded by Dr. Abdus Salam, Pakistan's Nobel Prize winning laureate. The Act was a visionary response to the rapidly advancing field of space exploration and the Cold War space race, wherein several countries were striving to venture beyond Earth's confining and abysmally deteriorating boundaries.[1] By establishing SUPARCO, Pakistan demonstrated its enduring commitment to advancing scientific knowledge and technological expertise in the space domain. It outlines the commission's core mandate and objectives. Its primary purpose is to engage in scientific and

[1] McDougall, Walter A. "Sputnik, the space race, and the Cold War." Bulletin of the atomic scientists 41, no. 5 (1985): 20-25. https://doi.org/10.1080/00963402.1985.11455962

technological research related to space and the upper atmosphere.[2] SUPARCO's key responsibilities include satellite development and deployment, space-based communication systems, and atmospheric research. The Act provides a clear direction for the agency, emphasising the importance of space research and its potential applications for the benefit of the nation.

The Act acknowledges the significance of international collaboration in space research and exploration. It enables SUPARCO to enter into agreements and collaborative partnerships with other countries and international organisations for joint research projects, technology transfer, and data-sharing initiatives.[3] Such collaborations allow Pakistan, a country thirsty for technological advancement and establishing itself on the international stage, to benefit from shared expertise and resources while contributing to global space advancements.

Significance of SUPARCO

Establishing SUPARCO underscores the importance of investing in research and development in the field of space and atmospheric sciences. This emphasis on R&D has enabled Pakistan to develop indigenous space technologies, launch satellites, and contribute to international space missions. The Act has facilitated the growth of a skilled workforce and scientific community dedicated to space exploration.[4] The Act recognises the critical role of space technology in enhancing national security. It empowers SUPARCO to engage in activities related to space intelligence, surveillance, and reconnaissance, enabling Pakistan to monitor and safeguard its territorial integrity and national interests from space.

[2] Mehdi, Miqdad, and Jinyuan Su. "Pakistan space programme and international cooperation: History and prospects." Space Policy 47 (2019): 175-180. https://doi.org/10.1016/j.spacepol.2018.12.002
[3] Mehdi, Miqdad, and Jinyuan Su. "Pakistan space programme and international cooperation: History and prospects." Space Policy 47 (2019): 175-180. https://doi.org/10.1016/j.spacepol.2018.12.002
[4] Malik, Asif Zafar. "Telemedicine country report-Pakistan." In 2007 9th International Conference on e-Health Networking, Application and Services, pp. 90-94. IEEE, 2007 https://www.infona.pl/resource/bwmeta1.element.ieee-art-000004265805

The Act acknowledges the significance of international space law and binds Pakistan to adhere to relevant treaties and agreements. By becoming a signatory to international space treaties, such as the Outer Space Treaty, Pakistan aligns itself with heyday global norms that promote the peaceful use of space, non-militarisation, and responsible exploration. Since its enactment, the SUPARCO Act has facilitated significant technological advancements in Pakistan's space programme. The commission's efforts have led to successful satellite launches, satellite communication systems, and the development of remote sensing capabilities.[5] These technological achievements have had practical applications in agriculture, weather forecasting, disaster management, and telecommunication.[6]

III) The Act: A Critical Review

While the Act played a crucial role in establishing Pakistan's space agency and outlining its objectives, it is not without dissent.

Stagnant and regressive

One of the primary criticisms of the SUPARCO Act is its lack of comprehensive provisions to address the evolving challenges and complexities in space activities. The Act was formulated during a time when space exploration in Pakistan, as well as in much of the world, was in its infancy, and technological advancements were relatively modest. As a result, the Act may not adequately cover various contemporary space-related issues, such as commercial space ventures, space debris management, and

[5] Hussain, Mian Zahid, and Raja Qaiser Ahmed. "Space programs of India and Pakistan: military and strategic installations in outer space and precarious regional strategic stability." *Space Policy* 47 (2019): 63-75. https://www.sciencedirect.com/science/article/abs/pii/S0265964617300929

[6] Anjum, Muhammad Naveed, Yongjian Ding, Donghui Shangguan, Ijaz Ahmad, Muhammad Wajid Ijaz, Hafiz Umar Farid, Yousif Elnour Yagoub, Muhammad Zaman, and Muhammad Adnan. "Performance evaluation of latest integrated multi-satellite retrievals for Global Precipitation Measurement (IMERG) over the northern highlands of Pakistan." *Atmospheric Research 205* (2018): 134-146. https://www.sciencedirect.com/science/article/abs/pii/S0169809517311018

the private sector's role in space exploration. A comprehensive overhaul of the act is needed to encompass all facets of modern space activities.[7]

Discourages private sector investment

The SUPARCO Act does not provide sufficient incentives or a conducive legal environment to encourage active participation from the private sector in Pakistan's space industry. The lack of opportunities for private enterprises to engage in space-related activities has stifled innovation and limit the growth of the space sector.[8] Other countries have embraced private sector involvement, leading to rapid advancements and cost efficiencies. Reforms are necessary to encourage public-private partnerships and foster a thriving space industry in Pakistan.

Lack of funding

Critics argue that SUPARCO has not received adequate financial support from the government, resulting in limited resources for ambitious space projects and research initiatives. Insufficient funding has hindered the development of cutting-edge technology and space infrastructure, impacting Pakistan's ability to compete on the global stage.[9] A reevaluation of the Act's financial provisions and increased investment in space research and development are essential to propel the country's space program forward.

Insufficient accountability

The SUPARCO Act does not mandate stringent measures for transparency and visible accountability within the agency. Critics contend that this lack of oversight may

[7] Cancan, Murat, Minhas Mahsud, Shakir Ullah, and Zafar Mahsud. "National space legislation: A dire need for Pakistan." *Journal of Statistics and Management Systems* 24, no. 4 (2021): 729-739. https://www.tandfonline.com/doi/abs/10.1080/09720510.2020.1818452

[8] Ahsan, Ali, and Ahmad Khan. "Pakistan's journey into space." *Astropolitics* 17, no. 1 (2019): 38-50. https://www.tandfonline.com/doi/abs/10.1080/14777622.2019.1578933

[9] Mehmud, Salim. "Pakistan's space programme." *Space Policy 5, no. 3* (1989): 217-226. https://www.sciencedirect.com/science/article/abs/pii/026596468990088X

lead to mismanagement of funds and inefficiencies in project execution.[10] Transparent reporting mechanisms and external audits are necessary to ensure responsible use of already insufficient public funds and enhance the agency's credibility.

Absence of international cooperation

While the SUPARCO Act recognises the importance of international cooperation, critics argue that Pakistan has not fully leveraged the potential of collaboration with other space-faring nations.[11] A lesser-known fact about Pakistan's space program is that the country was the first in South Asia to have become partners with the accelerated space program of the United States during the 1960s, aligning itself with the US Air Force and NASA. In lieu of this, Pakistan launched two-stage sounding rockets into space (Rehbar-I and Rehbar-II). This event made Pakistan just tenth in the world to have achieved a successful mission of the sort. [12]

It is despite this historic accession to greater opportunities that Pakistan lags so far behind than even its neighboring counterparts in extraterrestrial accomplishments.[13] Limited international partnerships have resulted in restricted access to cutting-edge technologies and research opportunities that would help reduce costs and allow for systematic betterments to Pakistan's space programme. Effectively, the Act should prioritise diplomatic efforts to foster collaboration with other space agencies, facilitating knowledge exchange and joint missions.

Despite Pakistan's all-weather ally, China, promising 1 billion yuan towards the construction and setting up of Pakistan's Space Center, there does not seem to be existent action towards this end.[14] This Space Center would act as the hub of all space

[10] McDougall, Walter A. "Sputnik, the space race, and the Cold War." Bulletin of the atomic scientists 41, no. 5 (1985): 20-25. https://doi.org/10.1080/00963402.1985.11455962

[11] Ali, Ghulam. "China-Pakistan space technology cooperation." *East Asia Forum,* vol. 9. 2011. http://tinyurl.com/279k8st4

[12] Chhatwal, Gp Capt Ravinder Singh. "PAKISTAN TESTS SHAHEEN-3 AND SHAHEEN-1A MISSILES." https://www.academia.edu/download/43447434/CAPS_Infocus_RS_16.1.pdf

[13] Ahmed, Raja Qaiser, and Misbah Arif. "Space Militarization in South Asia: India's Quest for Space Weapons and Implications for Pakistan." Asian Survey 57, no. 5 (2017): 813-832. http://tinyurl.com/2p8sk7ct

[14] Ahmed, Raja and Misbah, "Space Militarization…"

activity and construction in the country, with the development of satellites that cater to Pakistan's space needs whilst also living up to stringent international standards for the same. The facility had been intended to be equipped to perform functions such as system level assembly and launch operations. The claim was first made in early 2018. Since then, China has itself sent two Pakistani satellites to space; PRSS-1 and the PakTES-1A.[15]

Insufficient qualifications

Critics point out that the SUPARCO Act does not explicitly address the need for promoting space education and research initiatives within Pakistan. A strong emphasis on space science education and research is deemed essential for nurturing a skilled workforce capable of driving innovation and advancing space technology. This also includes provisions for space science education and research grants within the Act. It would bolster the country's long-term space capabilities.

Vague commercial terms

The SUPARCO Act does not evidentially present a clear framework for commercialisation strategies concerning space-related technologies and services. A well-defined commercialisation plan could open up the sort of revenue streams Pakistan requires in its efforts to promote economic growth within the space sector. The Act should thus incorporate provisions to foster commercialisation opportunities and facilitate technology transfer to the private sector.

IV) Conclusion

While the Space and Upper Atmosphere Research Commission (SUPARCO) Act of Pakistan laid the foundation for the country's space program, it has faced criticism for its limitations and outdated provisions. Addressing the concerns raised by

[15] Khan, Ahmad, Tanzeela Khalil, and Irteza Imam. "PakistanTs Space Activities 72." *Handbook of Space Security (2020)*: 1455. https://link.springer.com/content/pdf/10.1007/978-3-030-23210-8.pdf#page=1438

critics, such as the need for comprehensive legal reform, increased private sector participation, enhanced transparency, and stronger international collaboration, will be crucial for unleashing Pakistan's full potential in space exploration and utilisation. A revised and updated SUPARCO Act, aligned with modern space challenges and international best practices, could propel Pakistan's space sector toward new heights of success and innovation.

The policy brief concludes with a summary of key findings and emphasises the importance of robust space law for Pakistan's space sector growth. By implementing the proposed policy recommendations, Pakistan can leverage its space capabilities, foster innovation, and participate effectively in the global space community, while adhering to international norms and regulations.

IV) Recommendations

1. Comprehensive Space Legislation: To address the gaps in the current legal framework, it is recommended that additions are made to provide for enacting comprehensive space legislation that covers all aspects of space activities, including satellite launches, space debris management, and commercial space ventures.

2. Promoting Private Sector Participation: Measures to encourage private sector involvement in space-related endeavours are proposed, such as tax incentives, grants, and streamlined licensing processes.

3. Strengthening International Cooperation: It is recommended that attempts are made towards fostering diplomatic efforts to establish partnerships with other space-faring nations, facilitating joint research projects, data sharing, and technology transfer.

4. Capacity Building: Strategies to invest in research and development initiatives to enhance local space capabilities, including satellite technology and space science education, are outlined.

5. Space Security and Sustainability: Policy measures to address space debris mitigation and compliance with international guidelines on space sustainability are suggested.[16]

[16] Cancan, Murat, Minhas Mahsud, Shakir Ullah, and Zafar Mahsud. "National space legislation: A dire need for Pakistan." *Journal of Statistics and Management Systems 24*, no. 4 (2021): 729-739. https://www.tandfonline.com/doi/abs/10.1080/09720510.2020.1818452