Space Cooperation as a Diplomatic Tool: Prospects for Pakistan

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Abstract

The interest, of states around the world, to acquire space technologies has amplified enormously. As the amount of investment and sophistication of technology grew in space sector, every state, large or small, has its stake to participate in space activities. With the distinct characteristics of space environment / security and its dual use application, space systems provide unique opportunity for cooperation and competition in the international system. School of thoughts such as social interactionism and global institutionalism strengthen the idea to explore the prospects for cooperation among different countries in areas like space technology cooperation. This paper seeks to identify and explain the patterns of international collaboration in this regard with past experiences. It also tries to establish connection between space cooperation and seeking objectives of foreign policy of a state; for instance, the US and EU countries' collaboration during the Cold War. The study also assesses how space technology collaboration, when used as a diplomatic tool, strengthened the relations between countries. Finally, it evaluates the future prospects for Pakistan's space cooperation with regional states as well as with international space powers.

Keywords

Space Technology, Diplomacy, NASA, SUPARCO, ISRO, Space Collaboration

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Introduction

From the ancient era, the luminous and starry sky has always remained a fascination and mystery for mankind. Industrial revolution, and scientific research, in 20th century permitted humans to explore space. This enabled a new age for using space domain for different purposes such as peaceful and military etc. During the Cold War, developed countries such as the US and Soviet Union were leaders in space competition because of incredible industrial and scientific resources in their hands. As R. Jastrow and H. Newell stated in their paper that "the presence in space became a matter of scientific prowess, international prestige, and national security for states."[1]

From last decade of 20th century, tremendous technological advancement and economic progress in developing world developed a realization in various states that there is an acute need for them to claim their stakes in the midst of traditional space faring nations. Without any surprise, some of the developing nations, particularly those which have regional and international goals and ambitions, have readily expanded their limited resources for their space programs.[2] Moreover, the increased dependence on space-based technologies for communication, energy, health, and education means that emerging states feel a compulsion to develop and obtain their own space-based assets to ensure that their economic and political progress is credible and effective.[3]

With the passage of time, the number of space-faring nations has increased significantly with the evolving space technology. Currently, more than fifty countries, around the world, possess satellites (civil, commercial, government and military), and more than twenty countries have satellite launching facilities.[4] With the evolution of technology in space sector, there is increased utilization of space for both civil and military applications such as positioning, remote-sensing, communication, broad-casting, information gathering, surveillance and reconnaissance, early warning and missile defence through satellites. Advanced technology and constant presence in

space, by different countries, increased the vulnerability and risk in space (outer) activities. Few of the challenges in this regard include, congestion of outer space, increase in space debris, possibility of constant surveillance by adversary state, anti-satellite weapons (ASAT).

Apart from competition and rivalry in space, there is a huge potential for space cooperation among space faring states. Many countries have already explored the option of collaboration in space such National Aeronautics and Space Administration (NASA) international cooperation program with different countries, European Space Agency's (ESA) space collaboration program, and International Space Station (ISS) program. D. Broniatowski (et. al.) took the case study of space exploration while discussing international space cooperation as a tool to bring countries with shared interest closer. They stated four reasons why international space cooperation is beneficial for countries, such as (1) it saves money, (2) it brings diplomatic prestige to collaborating states, (3) it increases political sustainability, and (4) it enables workforce stability.[5] This paper will evaluate the potential of space cooperation in regional or international context as foreign policy and diplomatic tool.

Space Cooperation in a Theoretical Paradigm

The highly-networked and transnational nature of twenty-first century, the geopolitics has progressively changed the concept of independence. In a similar view, the first space flight had completely altered the idea of sovereignty and territorial boundaries in international system. Different theoretical frameworks of international relations theory like traditional realist, structural, liberal, and constructive models yield some insight into the calculus of different states' space policies and approaches. Thus, these IR theories provide broader framework for understanding the patterns of competition and collaboration amongst space powers. Professor J. C. Moltz proposed a useful catalogue in his book, *Politics of Space Security*, in which he explained international relations theories in

space competitive or cooperative context. He categorized these theories into four sections; firstly, space nationalism which is rooted in classical realism; secondly, technological determinism in structural realists' context; thirdly, global institutionalism which is based in liberal perspectives of international interdependence; and fourthly, social interactionism summarizing constructivists' model on space relations among different states.[6]

Global Institutionalism Theory

As during the early years of Cold War, major spacefaring states of that time (the US and Soviet Union) had abundance of resources – technological, financial, scientific – and political aptitude. So, the competitive space-based theories provided sufficient explanation of their relations in space context. Nevertheless, as the threshold lowered for space entry, states have started to explore more development-centric options emphasizing more on cooperative agendas in space- explained by liberal theories of global institutionalism.[7] Institutionalism is a modern theory of International relations which traditionally focused on the need for institutional arrangements to start and maintain collaboration between states. By the late 90s, as the economic flow through trade, business, capital and intellectual property began to dominate territorial economy, many states searched for better ways to connect to global supply chain.[8] Accordingly, liberal theorists have stressed on cumulative insignificance of territorial national boundaries to conduct and formulate national economic activity. The idea became specifically relevant, over fifty years ago, as Sputnik's global over flight completely changed the connotation of national boundaries.[9]

Space utilization is, time and again, deliberated as federative activity by boosting the accession to space governing treaties and executive bodies like International Telecommunication Union (ITU) for peaceful and cooperative orbital spaces.[10] Nancy Gallagher presumed that space-based activities are interdependent by nature, which provide incentives to collaborate along with competition.[11] Additionally, as

countries' territorial boundaries diminish in size globally, restrictions on decreasing national budgets and technical skill further encourage joint and multilateral collaborations on costly space activities – for example smaller and under-developed countries would be forced to cooperate with large space faring nations as well as amongst themselves to achieve shared objectives.[12] Lastly, theories of functionalist assistance deriving from European Union (EU) and ESA examples can conclude that transnational institutions can grow through iterative repetition to relocate national rivalry and alliances.[13] In functionalism's paradigm, scientific and technological cooperation is considered as a frontline collaborative effort because of perceptions of its political safety.[14]

Social Interactionism Theory

Assessing the example of EU and ESA integration, a different mandate of recurrent exchanges under the prospected future role played by epistemic community of technologists and experts who greatly impacted national understanding or explanations of national securities and interests, and became source of convergence in country's behavior on the global platforms.[15] These social interactionist and bureaucratic-organizational models give prospective understanding and vision to other smaller states and regions such as South Asia to focus on regional integration through space collaborations. Whereas contrasting national policy judgements may obstruct cooperation, there are balancing forces under national levels, which can oppose any such dilemmas. Both, the proponents of space nationalism and global institutionalism, accept that there is some degree of competition in space domain among states, and it depends on a state's perception and level of competition with others.[16] As space gets crowded, major space faring nations and stakeholders will have to establish norms to guarantee continuous access to the orbital investments[17] to circumvent spillover effects and harmful intrusion. This, indeed, will encourage iteration process of adoption of space norms by other states.

The course of advancing state's space policies and strategies has led to the establishment of parallel national space bureaucracies. Ernst Haas worked on three models of learning and adaptation by international organizations about their progressing mission orientations. His research proposed a method to examine states' organizational growth within the developing network of national and regional bureaucracies.[18] In the same way, Haas' analysis of global science and technology programs and their linkage to growing economic, social and political objectives give more insight into the fact that technical bureaucracies can play distinctive role in national and international politics as scientific culture has turned out to be indispensable with political life of a country.[19] It is likely that technocratic organizations have a special claim in political mindset that enables them to recommend major variations in global arena.[20] If the states' bureaucratic agencies-including technical and scientific communities-work together positively, particularly under helpful international umbrella organizations, there emerges the possibility of more powerful epistemic community in the region. Technocratic self-interest can act in defining national perspectives and plans, predominantly if similar national scientific bureaucracies are inclined to collaborate with each other regardless of the national boundaries.

International and Regional Space Collaboration Programs

International and regional cooperation in space sector have different roles such as collaboration in developing space technology industry, assisting in launching of satellites and sharing launch facilities, joint space exploration, sharing services such as communications, observation of earth, data gathering and sharing etc. through space cooperation. All these categories of cooperation in space have served as a foreign policy and diplomatic tool in a certain way, for example, NASA's cooperative programs, International Space Station (ISS) program, Japan space agency's international cooperation program, and India's launching of SAARC satellite.

John Krige[21] insisted that NASA's international programs are not only an important instrument of American foreign policy, but they remained particularly significant in their political and cultural aspects as well.[22] NASA's international programs were intended to build a community dedicated to the peaceful exploration of space with American help, particularly under American leadership which later became biased and politicized. In 1987 NASA Task Force put it, that "*international cooperation in space from the outset has been motivated primarily by foreign policy objectives*".[23] After few months of its inception, Committee of Space Research (COSPAR) announced that the US would help other countries in their scientific experiments using American satellites.[24] By 1965, NASA's international programs already got a boost and entered into cooperative arrangements with about 69 countries, including Britain, France, Italy, Germany, Australia, Japan, Canada, India and Pakistan.[25] In 1970s, NASA and ESA had agreed to launch joint satellites to perform a variety of challenging scientific experiments in domains such as solar physics, cosmic ray studies, and the exploration of the interplanetary environment.[26] NASA's international program served as soft power tool to strengthen trust and alliance of the US especially with European allies. Joseph Nye described NASA's international initiatives as agents of soft or co-optive power, as opposed to hard, coercive or command power.[27]

Regional Context

In May 2017, with the launch of Indian Space Research Organization (ISRO) South Asia Satellite, India harnessed its activities in outer space for its foreign policy goals.[28] Indian Prime Minister Narendra Modi had announced the launch of South Asia Satellite as a gift for SAARC members during 18th South Asian Association for Regional Cooperation (SAARC) Summit in Nepal in 2014.[29] The 2-ton telecommunication satellite, South Asia Satellite or GSAT-9, is a geosynchronous satellite featuring twelve Ku-band transponders and enabling a range of communications-related and meteorological

applications. With a planned mission life of twelve years,[30] the satellite cost approximately $36 million (235 crore rupees).[31] It was built, financed, and is operated by ISRO. States participating in the project other than India are bearing the cost of their respective ground systems. India asked participating regional countries to provide feedback, raise concerns about the project, and send representatives to an intergovernmental group which is responsible to manage the satellite.[32]

A complete picture of the nature of collaboration facilitated by this satellite project has not emerged in the public domain yet, but from available media reports, it is fair to assume that the primary function of satellite is to improve connectivity and delivery of public services like internet connectivity, tele-education, telemedicine, disaster management, meteorological applications, fishing and agricultural advisory notices, and natural resource mapping etc.[33]

Unsurprisingly, the preliminary reactions from South Asian states to Indian initiative of joint satellite ranged from cautious optimism to absolute apprehension, an evidence to India's complex relations with its neighboring states. With expressing some concerns, Sri Lanka was the first country to officially accept the offer and joined the project.[34] Bangladesh and Afghanistan were, both, unconvinced to join the project as both countries were working on their own satellites projects. Later, Bangladesh eventually joined the project. Afghanistan welcomed the Indian initiative, but had not officially joined the project by the time when the satellite was launched.[35] Nepal, Bhutan and Maldives do not have their own satellite programs, so the project seemed beneficial for them and so they joined the project right after the announcement by Indian Primer Narendra Modi.[36] Now, India, Sri Lanka, Bangladesh, Nepal, Maldives and Bhutan are the beneficiaries of this South Asia Satellite.

Pakistan also responded with enthusiasm to the satellite project in its early statements keeping aside its security concerns with India. In

June 2015, Pakistan offered to provide technical and financial assistance for the satellite project and asked that the project be brought under SAARC authority.[37] India rejected Pakistan's both offers and continued to proceed the *joint project* solely, claiming that the satellite was not SAARC satellite as such but Indian gift for SAARC member states. In August 2015, SAARC secretariat in Nepal sought to refer the project to SAARC's Technical Committee on Science and Technology, so that all SAARC member states can contribute to the project in technical and financial terms. But India turned down SAARC secretariat's proposal right away.[38] India's non-cooperative attitude pushed Pakistan to opt out of the project in March 2016.[39] The joint project, initially named the SAARC satellite, was renamed the South Asia Satellite. In fact, so-called joint project initiated by India was never joint because India wanted to maintain superiority over the project and rejected every possible effort of joint technical and financial support for the project. India has allegedly used South Asia Satellite to create India-bloc in SAARC and influence smaller South Asian states to oppose Pakistan for India's foreign policy objectives such as, in 2016, all SAARC countries boycotted the SAARC summit that was to be held in Pakistan, on India's call.

In February 2017, ISRO launched 104 co-passenger satellites in a single launch through its Polar Satellite Launch Vehicle PSLV-C37 from Satish Dhawan Space Centre (SHAR), Sriharikota.[40] Among these 104 satellites, only two satellites, ISRO Nano Satellite 1 (INS-1) and INS-2) were technology demonstration satellites from India. Remaining cluster of satellites were part of international costumer satellites from different countries such as the US, Israel, Netherlands, UAE, Kazakhstan, and Switzerland. In April 2019, India, once again, launched and placed multiple satellites in three orbits with a single rocket.[41] The satellites were launched through ISRO's PSLV-C45 from Satish Dhawan Space Centre. The constellation of 28 satellites carried India's domestic intelligence gathering satellite and smaller

international costumer satellites from the US, Switzerland, Lithuania, and Spain.

As part of New Delhi's space diplomacy, a tool the foreign ministry has been trying to wield as part of its neighborhood-first policy to counter China's influence in the region, India will set up five large ground stations and more than 500 small terminals in five neighboring countries – Bhutan, Nepal, Maldives, Bangladesh and Sri Lanka.[42] Apart from boosting regional cooperation, the move to set up tracking and receiving centers will also help put in place strategic Indian assets on their soil. These stations and terminals will help put in place applications ranging from television broadcasting to telephony and internet, disaster management and tele-medicine. ISRO meanwhile can use these ground stations to communicate with its own satellites.

Lessons and Future Prospects for Pakistan

In October 2018, Pakistan's then Minister for Information and Broadcasting Chaudhry Fawad Hussian announced that Pakistan's first space mission will be launched in 2022.[43] A memorandum of understanding (MoU) has been signed between Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) and a Chinese company in this regard. Before this declaration, Pakistan has already launched two satellites, Pakistan Remote Sensing Satellite (PRSS-1) and Pakistan Technology Evolution Satellite (PakTES-1A), by China in July 2018.[44] As compared to well-established and recognized Chinese and Indian space programs, Pakistan's journey into space remained slow due to multiple reasons, such as lack of political will, insufficient scientific, technological and innovative base and continuous economic struggle to name a few. Despite complex geo-economic and strategic regional environment, it is argued that Pakistan has the potential to gain benefit in space realm in the period where nations are aspirant of getting their share of the global space common.[45]

Pakistan established SUPARCO, as the descendent to the Pakistan Space and Upper Atmosphere Research Committee, in 1981 through a

presidential ordinance. Six years later, National Assembly of Pakistan endorsed its charter in 1987.[46] This committee became important tool to begin and test its initial series of sounding rockets, Rehbar, with support of NASA, British Space Center (BNSC), and French Center National d'Etudes Spatiales (CNES) and other Western aerospace corporations. SUPARCO started expanding its operations into satellite technology in 70s. Pakistan's space commission began exploring different fields including satellite imagery, telecommunication, atmospheric testing and other scientific measurements.[47] Pakistan also collaborated and participated in various scientific treaties and international accords with international organizations like the United Nations (UN).[48] According to James Clay Moltz, Pakistan's space program is a moderate program with regards to financial resources and projects amongst all nuclear weapon states, with international sanctions which have heavily affected Pakistan's scientific research efforts whether in field of space or nuclear technology.[49] However, Pakistan needs extensive and precise space-based information which is crucial to prepare for future challenge in potential sectors such as disaster management, agriculture, mining, and further economic fields.

Pakistan is moving slowly but gradually to craft its national space policy. While chairing the National Command Authority (NCA)[50] meeting in 2011, the Prime Minister Syed Yousuf Raza Gillani approved Pakistan's *Space Program 2040*,[51] which later renamed as *National Space Program 2047*.[52] Pakistan's National Space Program 2047 specified that the collected data and information will be used for the purpose of monitoring and planning of natural resources to improve the quality of life of a common man. It also envisioned commercial and private application of information, collected from remote sensing satellites, to stimulate economic progress of the country.[53] Experts argued that technological determinism is the best available and suitable option for Pakistan to meet its objectives in space,[54] but it is a known fact now that space diplomacy has worked

as an instrument for many countries to prosper their national space programs and Pakistan needs to diversify its options through effective foreign policy and diplomatic engagements.

Pakistan exists in one of the most complex regions of the world with regional and global interests involved. Due to divergence of geopolitical interests, Pakistan has lost important collaborative partners, NASA and many European space agencies. Despite economic challenges and international sanctions from Western countries because of its nuclear program, China remained a tested ally to provide access to Chinese space technology and infrastructure. Pakistan's first satellite, Badr I, was launched by China on its Long March 2E rocket in mid-1990.[55] In December 2001, Russian rocket launched Pakistan's 2nd satellite, Badr II, in Low Earth Orbit (LEO).[56] After the announcement of Pakistan's national space program in 2011, Chinese Satellite Launched Vehicle (SLV) launched Pakistan's first communication satellite to replace its PAKSAT-1.[57] As discussed earlier, launching of PRSS-1to monitor China Pakistan Economic Corridor (CPEC) projects[58] and PakTES-1A are recent examples of Sino-Pak space collaboration between SUPARCO and China Great Wall Industry Cooperation (CGWIC).[59] In another significant move towards indigenization of space assets with Chinese collaboration, Pakistan moved to China's BeiDou system from the US Global Positioning System (GPS) for military access.[60] Apart from extensive space cooperation with China, which has great potential for Pakistan, there is a need to explore other available opportunities as well.

Russian strategic and geopolitical interests have been diversified in South Asian region as India got closer to the US. Russia has a strong base of its space, civilian, commercial and military, program as it remained competitive major power in space domain via-a-vis the US during Cold War. Pakistan could potentially partner with Russia for future space collaboration, as Pakistan has already worked with Russia for its second satellite launch, Badr II. The frequency of interactions between Pakistan and Russia increased on different

regional and international forums in previous few years. A high level Pakistani delegation visited Russian Federation in 2018 and both countries emphasized on prospect of closer cooperation in different fields including space.[61] Alexey Dedov, Ambassador Extraordinary and Plenipotentiary of the Russian Federation in Pakistan, also acknowledged that both Pakistan and Russian have sufficient opportunities to build and advance mutually beneficial partnership in fields such as space industry and telecommunications.[62] Pakistan could also benefit from more than fifty years of Russian experience of manned space missions. Pakistan needs to collaborate with Russia or even some European countries on satellite launched vehicles (SLVs) and their launching facilities. As Russia is opening up to Pakistan diplomatically, the two countries agreed and issued a joint declaration on non-placement of weapons in outer space, during the recent SCO Council of Foreign Ministers' meeting.[63]

While exploring alternate options for space cooperation, Pakistan can collaborate and help friendly states like Turkey with its experience to successfully establish space program which is only few months old now.[64] Pakistan could propose Turkish space agency to have joint venture in scientific research in space, as Pakistan has experience, specifically in satellite manufacturing, and Turkey can provide with monetary resources for such joint projects. As in March 2019, SUPARCO has initiated talks with UAE during this year's space conference, *Global Space Congress*, in Abu Dhabi.[65] Dr. Arif Ali, Secretary of SUPARCO, stated that the potential cooperation areas between Pakistan and UAE would be satellite manufacturing and related applications. Nevertheless, Pakistan can also propose its cooperative services for UAE's Mars Science City Project; which is multi-million dollars' research project for exploration of red planet, to be completed in next five years.[66] Apart from UAE, Saudi Arabia is another good option in the Middle East for Space collaboration. In late 2018, Saudi Arabia announced a royal decree to establish its own space agency, after launching two indigenously designed satellites by

China.[67] Kingdom of Saudi Arabia (KSA) has already announced and signed MoU with ten other Middle Eastern states to collaborate on national space exploration program.[68] As KSA has limited experience in satellite technology but a bulk of financial resources to realize it vision of scientific research and space exploration, Pakistan needs to explore its options for cooperation with newly established space agency of KSA.

Iran could be one of the most reliable and suitable options for Pakistan for regional space diplomacy in current circumstances. As we know that Iranian space program is comparatively young, but Iran is one of the few nations which can launch their satellites by their own launch vehicles.[69] But the instant future possibilities of space cooperation between Pakistan and Iran are cut down due to the current rift between Iran and the US and imposed economic sanctions on Iran.

According to a safe estimate, Pakistan's half population is under age of 35, among whom a good number could be considered as potential human resource in field of space research. On national level, Pakistan needs to focus extensively on science, technology, engineering and mathematics (STEM) which provides base to space research. For developing an indigenous space program, Pakistan needs to have joint ventures with different countries with broad experience in space technology to have its human resource trained internationally and bring skilled workforce to contribute to national space program.

Conclusion

Several states in this world run their national space programs as an essential component of their diplomacy and projection of *soft power*. There are certain limitations to the idea of using space technology as instrument of soft power, as NASA never got approval and funding to have bilateral coordination program with Chinese space agency due to differences over their strategic interests.[70] In another instance, despite Pakistan's serious concerns, India proceeded to manufacture

and launch SAARC satellite excluding Pakistan which is one of the most significant members of SAARC group. Despite some limitations, there is great potential to use space technology as a foreign policy and diplomatic tool, especially by states like Pakistan which need to have diversified sources to generate revenues and be included in the space economy.

Space diplomacy and international bilateral or multilateral collaborations will help Pakistan in different ways. First, international cooperation will assist Pakistan in ingraining sense of technological self-reliance in field of space technology. Secondly, successful space missions will help to elevate element of international prestige for Pakistan. Space is considered as the ultimate frontier in international diplomacy between states. If other elements such as economic, political, defence and military, or societal and cultural approaches do not work to develop international cooperation and unify a separated world, space collaborations may stand firm to build the bridges. The options of space diplomacy in terms of civil, commercial and military technologies can not only provide Pakistan an opportunity to strengthen its ties with regional countries but it will also make Pakistan's standing firm on international platforms.

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