

India needs a comprehensive space policy

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Space is considered to be the final frontier for human survival¹. The 21st century explorations are increasingly focused on building and launching of spacecraft for myriad purposes; ranging from non-commercial activities to operating space stations, commercial human space flight, planning missions for mining on celestial bodies, etc. Space missions of sending rovers and orbiters to distant celestial bodies have become a norm, and no more a monopoly of few dominant countries. Vikram Sarabhai, 'father of the Indian space programme', emphasizing the importance of space programme in India mentioned that 'there are some who question the relevance of space activities in a developing nation. To us, there is no ambiguity of purpose. We do not have the fantasy of competing with the economically advanced nations in the exploration of the moon or the planets or manned space-flight. But we are convinced that if we are to play a meaningful role nationally, and in the community of nations, we must be second to none in the application of advanced technologies to the real problems of man and society'². Since then, India has come of the age in space exploration, from its modest beginning to conceiving a complex mission of sending humans to space in 2022 and building its own space station which would be placed in lower earth orbit by 2030.

India's goal of sending Chandrayan-2 to the Moon was one of the most challenging and complex missions undertaken by the Indian Space Research Organisation (ISRO) since its inception. Globally, the paradigm shift in space exploration is not just driven by the State entities, but equally by ambitious private players like Space X, Virgin Galactic, etc. The transformation could also be seen in India with private players like TeamIndus, who are emerging to compete at a global level and there is an increasing commercialization of space with the establishment of Antrix Corporation Limited in 1992. This change in the Indian space sector should be guided by a comprehensive policy for systematic and systemic regulation. In this backdrop, a space policy should aim to expand the industry and create the resilience that

space security requires. The policy must also ensure compliance with India's international obligations and establish standards to ensure compliance to legal, ecological and other aspects associated with space and its missions.

The emergent space policy should be in line with the international regimes and in country-specific context to address the externalities of exploration and to meet its strategic objectives. In this context, addressing the challenges associated with future exploration needs 'renewal of policies relating to commercial as well as public service systems'³. The review of space policies would reveal the dimensions and their elements which could be considered for policy formulation. Currently, the Indian space sector lacks a comprehensive space policy.

Space policy: India and the globe

Globally, many nation States have their own space policies, and the United Nations (UN) allows them to consider enacting and implementing national laws authorizing and providing for continuing supervision of the activities in outer space of non-governmental entities under their jurisdiction. The United Nations General Assembly (UNGA) has passed 132 resolutions since 1958 entitled 'International cooperation in the peaceful uses of outer space'⁴. Though these resolutions are not legally enforceable, they provide an important guideline to States on conducting space-related operations by formulating their own laws. The Sofia guidelines for a Model Law on National Space Legislation⁵ acts as guidelines for countries in drafting their specific legislations. There is a rapid increase in the countries adopting their own space laws, and it is the fastest growing area of space law especially regulating the space activities of non-governmental entities⁶. The space exploration is regulated by UN treaties, principles and its resolutions.

Space ambitions need to be driven by prudent policies and laws. Globally, 'States that have enacted national space legislations have taken a number of different approaches in dealing with their space activities/mission. National space

legislation can be contained in unified acts or a combination of national legal instruments. Furthermore, some States have adapted their national legal frameworks according to the specific needs and practical considerations of the range of space activities conducted, and the level of involvement of non-governmental entities'⁷. India is one of the signatories to treaties and principles that have evolved under UN Committee on Peaceful Uses of Outer Space (UNCOPUOS), set up by UNGA to govern the exploration and peaceful use of space for the benefit of all humanity⁸.

According to articles 51 and 253 of the Constitution, India has the responsibility to implement international treaties. Policies regarding space have been initiated since 1960s with the genesis of important international conventions leading to the Government of India (Allocation of Business) Rules 1961. Under these rules since inception, the Indian space programme has been undertaken by periodic policies made by the Department of Space (DOS), Government of India. The DOS has formulated policies broadly under satellite communication, and remote sensing category over a span of time. Currently, there are two sets of policies guiding the space programme, i.e. Satellite Communication Policy (SCP) and Remote Sensing Data Policy (RSDP). SCP was adopted in 1997 and recognizing the importance of remote sensing data, GoI adopted RSDP in 2011. The DOS on studying the Model Law on National Space Legislation under Sofia guidelines 2012, has drafted the Space Activities Bill 2017 (ref. 9). This is yet to become an act; it is not preceded by a comprehensive policy.

A case for India

The long-term space exploration by India is not only technologically challenging, but also challenging in terms of economy, ecological impacts and political decisions, and the increasing role and interest of private players in commercial space exploration has brought to fore the need for a comprehensive space policy for the country¹⁰. Space explorations,

especially developing countries have to consider myriad issues which are complex in nature, and solutions have to come from an integrated regulatory framework. A systematic approach to such problems would surely help policy makers. Space operations involve complex interactions at multiple levels between stakeholders and agencies. The policy mechanisms have to be robust to regulate building and launching of vehicles, placing spacecrafts in specific orbits and recovering them, etc. The interaction and coordination required therein, calls for policies and laws to consider exploration as an integrated system for effective and efficient coordination.

The Indian space policy must fundamentally subsume the spirit of rules-based international order. It needs to align with international policies such as the Outer Space Treaty of 1967 (ref. 11), the Rescue Agreement of 1968 (ref. 12), the Liability Convention of 1972 (ref. 13), the Registration Convention of 1976 (ref. 14), and the Moon Agreement of 1979 (ref. 15).

The Indian stance towards outer space activities must also include consideration of its relationships with bilateral and multilateral agreements governing space activities¹⁶. The analysis of laws of different countries would give useful inputs for drafting such a policy. At present, at least 28 countries have their own space legislations¹⁷. The existing rules and guidelines in India have to be reviewed on the basis of their relevance. They should cover the registration aspect, so as to be in line with the Registration Convention, wherein States are required to register space objects launched by private or individual citizens.

Any 'space activities should require authorization by a competent national authority; the authorities and procedures, as well as the conditions for granting, modifying, suspending and revoking the authorization should be set out clearly to establish a predictable, and reliable regulatory framework. The conditions for authorization should be consistent with the international obligations and commitments of States, in particular under the United Nations treaties on outer space'¹⁸. The policy has to deal on licensing issues to permit the private industries and individuals to engage in space activities, and terminate the license when they violate the laws. The policy also needs to address the issue of mitiga-

tion, insurance, debris, liability, sanctions, etc. to meet the challenges of commercialization in the space industry.

The Indian space policy has to consider territorial and personal jurisdictional scope as it deals with different entities working in the space domain, like government agencies, non-governmental organizations, private entities and academia regarding their authorization and regulation. The next area of focus must be the managerial aspect involving implementation of policies, monitoring and controlling of activities, establishing the safety mechanism, liability for damage and compensation at every stage of space exploration from building vehicles to launch, re-entry to recovery, etc. The policy has to chart out a set of outcomes having an impact on the economy, science, defence, technology and social aspects at the global, regional and national levels.

The way forward

Space exploration may be a country-specific endeavour, but it has a global impact and needs constructive regulation. The multi-lateral convention has remained dormant since the Moon Agreement of 1979, and States are left to develop their own policies and laws. The international conventions and regimes have emerged from the perspective of developed countries. In this context, the indigenous space policy of India formulated from a developing country experience and evidences would significantly augment the international conventions and regimes to new realities. It would help in harmonizing India's policy with other countries. The need of a comprehensive space policy is sine qua non for India to become a prominent space-faring nation and to protect its environment, property, territory and citizens.

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