

Introduction

India is one of the leading space faring nations with space assets to the tune of about \$26 billion. Since launching its first satellite into the space in 1975, it has built an impressive array of space assets notwithstanding the technology embargo of various kinds by other leading nations. Today, India has 29 satellites in space including nine geostationary and eight polar orbiting satellites. It has so far launched more than 25 satellites for the foreign vendors. It has demonstrated the capabilities to launch multiple satellites simultaneously and has also developed capabilities in micro-satellites.

From 2003 to 2010, funding of the space programme has increased 144 per cent from Rs 23.68 billion. Indian Space Research Organisation is the principal body responsible for developing the space programme. The Indian government allocated Rs. 66 billion rupees (\$1.45 billion) for the ISRO in the 2011-2012 budget, representing a 36 percent increase over last year's budget. During 2010 the money allotted was Rs 57.78 billion which was 22 per cent more than the 2009 (amounting to 0.14 per cent of GDP). Space spending is expected to increase further by an average of 14.8 per cent annually over the next four years and estimated to be about Rs 100 billion by 2014. India is presently ranked sixth in the world in terms of space budget and technological capabilities, behind the US, Europe, Japan, Russia and China.

Space is an important element of India's scientific and security architecture. As Indian space programme matures, space will contribute significantly to Indian economic growth. International assistance and collaborations is an essential part of India's space programme and Indian investments in space arena are likely to multiply in near future.

While India has built an impressive space programme, the challenge of ensuring the protection of its assets is a daunting one. The nations' security interests as well as economic development depend on the security of these assets. Thus, space security is emerging as an important element in India's national security matrix.

While India's space planners have done well to develop a space programme to match the country's socio-economic need, there is yet little clarity on how India wishes to use space for its national security needs. As per Dr K. Kasturirangan, former Chairman, ISRO: "India cannot be immune to the rapidly changing international security environment, the emergence of new space order, the threat to its national security from the nuclear and missile capabilities in its neighbourhood and vulnerabilities of its space assets. Space security becomes important in the context of not only Indian civilian programme but also in the context of its national security."

In India the need to have a space security policy is being increasingly debated in the public forum. The IDSA Task force on space security in 2009 produced a report in which an attempt was made to conceptualise what such a policy might look like. Since then a few more conferences and seminars have been held. However, the government has so far been reticent in articulating such a policy. This may well be due to the fact that given the complexity and sensitivity of space related issues, the government would like to have well considered view.

The IDSA held a national seminar on space security on 30-31 March 2011 to debate the various issues having a bearing on space policy. The seminar was supported by the Ministry of External affairs. Well known experts and scholars presented papers on the security, technological, diplomatic, legal and organisational aspects of a possible space policy for India. Key policy makers were also present.

Amitav Mallik deals with the concept of space security and underlines its various dimensions including the technological, legal and diplomatic. He outlines the changing space security environment and the growing international concerns over the rapid growth of space technologies many of which are not benign. He argues that while there is convergence among nations that outer space must be preserved as a 'common heritage for all mankind', significant divergence is emerging due to increasing integration of space capabilities into the security strategies of powerful nations and the consequent perception of the vulnerability of space assets. It is therefore very important for all space faring nations to urgently debate and agree on how best to preserve the 'peace balance' in outer space. Meanwhile, it should be clear that India as a major space faring nation, must develop indigenous counter space technologies to ensure security of its space capabilities.

The US, as the world's foremost space power, has a major role to play in the development of overall space security environment in the world. C V Sastry critically examines the 2010 US space policy highlighting its key elements. The US is concerned about the rise of newer space powers like China but it will not be prepared to lose its space supremacy despite budget constraints and ageing

space assets. It will not give up its missiles defence programme. But, under President Obama, the US has signalled it is prepared to engage with other nations on suitable CBMs. At the same time US is unlikely to accept any legal regime aimed at explicitly curbing weaponisation of space.

China's space programme has grown by leaps and bounds in recent years. Its ASAT test in 2007 sent alarm bells ringing across the globe as it not only signalled China's accomplishments but also created debris in high orbits which created huge threat to satellites. What are the objectives of China's space programme? Arun Sahgal in his paper on China's space policies opines that it has the ambitions of becoming a space superpower. This has implications for India. In author's view, to deal with the implications of China's rapidly expanding programme, India must develop its own space capabilities.

The current international law envisages the use of space for only peaceful purposes. But, given that space is becoming indispensable for national security needs and also commercial exploitation of space is increasing, the law governing the space is coming under increasing stress. Ranjana Kaul in her chapter analyses the current status of international space law regime and points out that there is growing tendency among nations to work outside the UN institutions and structures. She feels that the law as it stands today is insufficient to deal with the new challenges growing out of new technological developments, arms race, commercialisation of space and growing congestion in outer space. The space law as it stands today may not be able to prevent arms race in space or weaponisation of space.

In India there is reluctance to talk about use of space for national security needs including its military applications. Rajeshwari Rajgopalan Pillai points out that India's space programmes has been developed primarily for civilian purposes but there is increasing trend now to use space for national security needs too. Efforts are being made to synchronise the activities of Indian Space Research Organisation (ISRO) which is responsible for India's civilian space programme and the Defence Research and Development Organisation (DRDO) which works on the use of space for national security needs. On the international front, she analyses the deadlock at the Conference on Disarmament where space security issues ought to be discussed. She recommends India to be proactive in establishing a 'code of conduct' that could define 'dos and donts' for space faring countries while using outer space for their security and development needs.

The unilateral withdrawal of the US from the ABM treaty and China's 2007 ASAT test has strengthened the trend towards weaponisation of space. Arjun Subramaniam feels that there are no easy methods to reverse the trend. He recommends establishing an aerospace command for India and holds the views that such a structure will not conflict with the development goals of the nation and will be well within the bounds of prevailing legislation.

Rajaram Nagappa examines in detail the frontier space technologies being developed by leading space faring nations such as the US, EU, Russia, Japan, China and India. He examines the various kinds of threats to Indian space assets and emphasises that India must develop critical technologies to meet these threats. Sufficient attention should be paid to the organisational structures need to plan, formulate and implement an effective space security policy.

Vinod Kumar in his paper takes a close look at the overlap between the ASAT and missile defence technologies. Only a thin line divides the two. Both kinds of technologies can usher in an arms race in outer space as is becoming evident, as China, the emerging space power begins to challenges the US, the established space power. Analysing the implications for India, the author feels that India should not go for a tit for tat response to China's ASAT capabilities as an Indian ASAT may not necessarily deter China. A nuclear deterrent type of equation will not work in the case of ASAT. He argues instead that India should develop an exo-atmospheric BMD systems of which ASAT capability would be a spin off.

Deepak Sharma however takes a somewhat different line from other authors. Analysing the threats to Indian space assets, he argues that India should not concentrate on development of ASAT or other space weapons at least for the next 10 to 15-years although R&D can continue in this direction. In his opinion development of space weapons capabilities will prove to be very expensive and retard India's efforts to utilise space for developmental purposes. He suggests development of electronic warfare capabilities and counter EW capabilities as these are simpler to develop and effective at the same time.

Arvind Kumar argues that the ASAT test conducted by China has created an asymmetry and imbalance in the space domain and India requires to evolve a robust strategy, which would be designed to increase the overall capabilities. He also argues that India needs to evolve mechanisms to protect its space assets.

Analysing the recent trends in space security, Arvind Gupta argues that there is urgent need for a space security policy for India. Space will play an increasingly important role in India's national security. Articulation of a space security policy will clarify the objectives of India's space programme and also provide markers for the future development of India's space capabilities.

In the end the book sums up the debate in the from of several themes which would help formulate a space security policy. India should clearly analyse the likely threats to its space assets. The link between the country's nuclear and space policies should also be clarified. The book also addresses the areas in which India should be proactive at international fora. This volume also includes suggestion towards a possible organisational structure to plan, formulate and implement a space security policy. It recommends the setting up a space security commission under the Ministry of Defence with a space security centre consisting of diverse

elements drawn from DRDO, MEA, MHA, industry, armed forces, and other stakeholders. The Space Security Commission which will look into the needs of national security is linked with the prevailing space commission which is in charge of the civil space programme.

Diverse views were expressed at the seminar. But there was agreement that India's considerable space assets need to be protected and space must be utilised for national security needs while ensuring that space is not weaponised. The use of space for military purposes is however legitimate and India must not hesitate to develop suitable capabilities to leverage this for national security.

The key take away from the seminar was that the government should articulate a space security policy. Having such a policy will not only bring clarity to the government's plans to build and protect its space assets but also help India's engagement with other countries and institutions.

Editors