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# Space Benefit Security

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## Space security

In the extremely provocative and highly charged star wars atmosphere, weaponisation of space by any global power is bound to initiate actions and reactions by other space powers, resulting in an arms race in space. Space weaponisation envisages deployment of directed energy weapons such as space based lasers, kinetic energy weapons, conventional warheads, anti-satellite (ASAT's) weapons, inter-continental ballistic missiles etc., in space. Even though detonation of nuclear warheads in space is not yet a part of the plan, it cannot be totally ruled out in an asymmetric warfare scenario. Accidental or intentional use of directed laser and kinetic weapons, triggering of space mines and the use of very high energy electro-magnetic impulses can damage a large number of particularly low earth orbiting civilian and commercial satellites rendering them totally dysfunctional. The extensive creation of debris from the destruction of space objects themselves would create unacceptable risks to civilian operating systems in space.

Space weaponisation will no doubt be highly detrimental to space security, jeopardizing the space assets of various countries, which are being extensively used for peaceful applications. While developed nations have alternate means of providing services related to communication, disaster management, meteorology, education, health and management of natural resources, many of the developing countries today depend solely on their own or available space assets for these vital applications. Under the "first come - first served" principle of the International Telecommunications Union (ITU), developed nations have already established a virtual monopoly in the occupation of geostationary slots, leaving very few opportunities for the upcoming developing countries. In many cases developing countries have had to curtail their services for coordinating their slots with the already established services. In spite of these limitations, thanks to the developments in space technology, many developing countries have been able to build space-based services either by leasing space services from other countries or by having their own satellite systems. Widespread application

of space technology benefits has become the vital component of socio-economic development for many of the developing countries like India. What is at stake here is the peaceful uses of space applications by the large majority of people including those in the poverty stricken developing nations.

## Space assets for socio-economic development

Developing nations not having adequate infrastructure have been able to leap frog by leveraging space technology. The Indian Space Programme, for example, is primarily application oriented, aimed at solving identified national tasks for all around socio-economic development of the nation, on a totally self-reliant basis. Starting with a modest beginning in 1963 with the establishment of an equatorial rocket launching station for carrying out sounding rocket experiments in meteorology, aeronomy, and astronomy with the help and assistance from NASA (USA), the Soviet Union, CNES (France) and the UK, it carried out the first major sociological experiment called the Satellite Instructional Television Experiment (SITE) in 1975 using NASA's ATS-6 satellite for imparting developmental education to 2,400 backward rural villages in the country. Encouraged by the success of this experiment, India undertook to build satellite technology capability for providing communication, meteorological and remote sensing services to the country on a nationwide scale.

India, a country with a multiethnic population of over one billion, speaking more than 20 major languages and 400 dialects, is now being served by about 80 transponders on a number of INSAT satellites to meet its communication, broadcasting, distance education, developmental education and disaster management requirements. Regular meteorological imaging from the INSAT system of satellites not only helps in providing weather information to the large Indian population, but also has become the only source of meteorological information over the Indian ocean for the entire world.

Similarly, Indian Remote Sensing Satellites (IRS) are extensively used to monitor forestry, soil characteristics, water resources including underground water, agricultural crops, environmental pollution, command area development, mineral resources, land use practices and also to initiate sustainable integrated development at each watershed level. Establishment of over 20,000 VSAT's in the country, which is growing at a compounded rate of 20 per cent a year, has made it possible to transmit data and information to even the most remote corners of the country, enabling the vast rural population to receive the benefits of distance education and tele-medicine. Development of low cost information kiosks are now providing access to a large number of villages to obtain information related to better agricultural practices, land records, fertilizers, market trends etc. Leveraging the availability of technically qualified scientists and engineers, India has successfully built a strong space program

including rocket launching capability, satellite manufacturing technology and application technology programs.

China likewise has built a very strong space program and has been using its space capability for distance education, teacher training, communication and broadcasting services and management of its natural resources. China has established over 50,000 VSATs across the country for supporting their extensive educational training program. Indonesia is able to provide reliable connectivity and educational services to the sparsely distributed population in thousands of small islands belonging to the country. Other countries like Thailand, Mexico, South Africa and many of the Latin American countries have either bought satellite systems or leased transponder capacity from commercial satellites to enable their citizens to benefit from space technology applications. Many of the developing nations have also set up ground based facilities to enable them to receive imagery from meteorological and remote sensing satellites through bilateral arrangements with providers of such space services. A few of the countries have also developed their own capability to fabricate and use mini-satellites for specific applications.

The phenomenal developments in space technology, digital compression techniques and convergence of computer and communication technologies have initiated the information technology revolution across the world. This has resulted in shifting the comparative advantage to those nations which can access, analyze, assimilate, synthesize and use the vast bank of data and information, which is pouring in at the rate of 20 trillion bits a day. Additionally many developing nations like India, China and the Philippines have also become attractive destinations for outsourcing services, thanks to the establishment of reliable communication infrastructure using space assets. In summary, application of space technology has become a vital component of socio-economic development for many of the developing countries in the world. Any disruption of their space services will no doubt cause an incalculable harm to the developing nations severely affecting their ability to effectively compete in the globalized economy.

## Conclusion

Space weaponisation has indeed become a major threat to civilian space assets, on which the future well being of many nations, developing nations in particular, depend. A unilateral commitment by the major space powers not to be the first to deploy space weapons or to carry out destructive anti-satellite weapon tests would indeed be a first step in the right direction to avoid an arms race in space. Such a commitment could be further strengthened by the major powers also making an open declaration stating that

they will not be the first to use nuclear weapons. Eventually a comprehensive treaty forbidding space weaponisation is the only answer to ensure safety to space