## 1

#### Private sector development is happening now and is necessary to scale up and lock in India’s status as a powerhouse in space.

EdexLive, 06-25-2020, "Opening space sector will enable India to play important role in global space economy: ISRO chief," New Indian Express, https://www.edexlive.com/news/2020/jun/25/opening-space-sector-will-enable-india-to-play-important-role-in-global-space-economy-isro-chief-12874.html

SRO chief K Sivan on Thursday stated that opening the space sector for private enterprises will help scale up benefits from space technology and enable Indian industry to be an important player in the global space economy. "If the space sector is opened (for private enterprises), the potential of the entire country can be utilised to scale up benefits from space technology. It will not only result in the accelerated growth of the sector but also enable Indian industry to be an important player in the global space economy," the Indian Space Research Organisation chief said. Sivan said that far-reaching reforms in space technology in India will put the country in the league of the select countries. "As part of longer socio-economic reform, space reforms will improve access to space-based services for India's development. Far-reaching reforms will put India in the league of few countries with efficient promotional and authorisation mechanism for private-sector space activities," he said. Talking about reforms that the government is planning to implement in the country's space sector, he said, "Space sector, where India is among a handful of countries with advanced space technology, can play a significant role in boosting the industrial base of India." "The government's decision is to implement reform measures to leverage ISRO's achievement by opening the space sector for private enterprises," he added. He further said that "Department of Space will promote sector space activities to enable it to provide end to end space services, including building and launching of rockets and satellites as well as providing space-based services on a commercial basis." "With this, there is an opportunity for large scale employment in the technology sector and India becoming a global technology powerhouse," ISRO chief added. Sivan also talked about the government's decision to establish an autonomous nodal agency for taking independent decisions for regulating the activities of private companies. "Government has approved the establishment of an autonomous nodal agency - Indian National Space, Promotion and Authorisation Centre - for taking independent decisions with respect to permitting and regulating the activities of private companies in the space sector," said ISRO chief. "It will act as a national nodal agency for handholding and promoting the private sector in space endeavours and for this ISRO will share its technical expertise as well as facilities," he added.

#### India private sector is key to space success – low cost operations, transparency, and accountability.

Rajagopalan ’20 [Dr Rajeswari (Raji) Pillai Rajagopalan is the Director of the Centre for Security, Strategy and Technology (CSST) at the Observer Research Foundation, New Delhi., 5-24-2020, "India’s Space Programme: A role for the private sector, finally?," ORF, <https://www.orfonline.org/research/indias-space-programme-a-role-for-the-private-sector-finally-66661/>]

India’s finance minister Nirmala Sitharaman announced last week that India’s private sector will play a key role in augmenting India’s space programme, and that the government intends to share the facilities of the Indian Space Research Organisation (ISRO) with the private sector. This announcement was part of the Narendra Modi government’s call for new and bold reforms in an effort to promote its ‘self-reliant India’ mission. It is the fourth segment of the Rs 20 lakh crore Aatma Nirbhar Bharat Abhiyan special economic stimulus. Sitharaman’s announcement entails a role for the private sector, possibly with the goal of greater investments in technology development and acquisition, capacity-building and space exploration, including planetary exploration. The minister, while announcing these reforms, appeared to understand that the private sector can help augment India’s space capability. While praising the work done by ISRO, she also pointed out that the private sector is also doing a lot of work in developing space technology. She also acknowledged that the existing regulations prevent private entities from using or even testing their products. Therefore, to level the playing field, the government “will make a provision for the private sector to benefit from the assets which are available to ISRO and for India (in general) to benefit from.” The minister also said the new reforms would allow the private sector to play an active role in “satellites, launches and space-based services”. But as always, implementation is key. Properly executing these reforms will require enabling policies and appropriate regulatory frameworks. That the new reforms will allow private sector players to use ISRO facilities is a big deal. This indeed must be music to the ears of commercial players who have been seeking to get a fair share of the pie in terms of manufacturing of satellites and propellant technologies, among other areas. It should not be too difficult for India’s private space sector because there is a sizeable talent pool available outside ISRO. More importantly, the entry of the private sector, as in the telecom sector, can bring several advantages in terms of cost and access. Following the announcement, ISRO tweeted that it will follow the government’s guidelines to allow the private sector to undertake space activities in the country. Though this did not seem particularly welcoming of the government’s initiative, ISRO’s support is critical to making it a success. ISRO has in the last few years been opening up to the Indian private space sector in a gradual manner – mostly as a matter of compulsion because ISRO simply does not have the in-house capacity to address India’s growing requirements. Today, the Indian space programme is not just about civilian applications for remote-sensing, meteorology and communication, as in the early decades. India’s space sector and its requirements have grown enormously in the last decade to include television and broadband services, space science and exploration, space-based navigation and, of course, defence and security applications. Among others, Ambassador Rakesh Sood has articulated the need for legislation to facilitate ISRO’s partnership with industries and entrepreneurs. Narayan Prasad and Prateep Basu, two prominent faces in the Indian space start-up segment, have argued that despite ISRO’s successes, “India’s space competitiveness has suffered from the absence of a globally reputed, private space industry.” The private sector, especially the NewSpace industry and start-ups, have an advantage in terms of low-cost operations, which itself should be a big incentive for the government to make it an active stakeholder. A certain amount of democratisation of space technology with the participation of the private sector can ensure costs are kept low. And expanding the number of stakeholders will also ensure more transparency and better accountability and regulatory practices. This has been missing in India’s space sector. The same agency has undertaken promotion, commercialisation and regulatory functions – which is not healthy.

#### India space key to soft power.

Hickert 17 Cameron Hickert, Harvard’s Belfer Center for Science and International Affairs, Schwarzman Scholars, "Space Rivals: Power and Strategy in the China-India Space Race - Schwarzman Scholars", August 14, 2017, <https://www.schwarzmanscholars.org/events-and-news/space-rivals-power-strategy-china-india-space-race/>

The regional rivalry between India and China has long simmered, and the next frontier increasingly appears to be space. Beyond the hard power dimension, this regional space race has taken on many of the soft power characteristics of the competition between the U.S. and U.S.S.R. during the Cold War. It should not be forgotten, “a major factor in the Asian space race is prestige, as rapidly developing countries there use technology to jockey for status. Space technology in particular, being flashy and complex, often captures the most cache.” Because soft power is about perception and attraction, demonstrating prowess in space capabilities is a crucial step in building this power regionally. Many of the feats that China and India are pursuing have already been achieved by the U.S., so mistakes are costlier in terms of international credibility – failures are perceived as worse when another nation has already been successful. Yet the attraction power of spaceflight achievements is more lucrative than in the past, as private entities around the world face tighter competition and shorter timelines in launching satellites, and are therefore willing to bring their business to any nation that can demonstrate the ability to launch cargo safely and cheaply. A prime example is India’s recent launch of 20 satellites on a single rocket; this mission included satellites from around the world, including the United States. The increased soft power borne out of a successful space program therefore is not only useful in the struggle for regional prestige, but also paves the way for increased economic success in a fast-growing industry.

#### India k2 taking up the climate change and alternative energy cause

GPC 17 [(Greater Pacific Capital, investing institution designed to identify and develop investing opportunities in and between India and other international economies), “Path to Power: India’s Great Opportunity in the Changing World Order,” 7/17/17, Greater Pacific Capital, <https://greaterpacificcapital.com/path-to-power-indias-great-opportunity-in-the-changing-world-order/>

Taking up the Climate Change and Alternative Energy Cause**.** The US withdrawal from the Paris Climate Accord has left a serious gap in climate change leadership that has yet to be filled.  While the rest of the world has vowed to continue without the US and China has signalled its willingness to play a greater role in the process, the size of the challenge facing the world exceeds any one country’s ability to lead alone on the matter. India, as the world’s fifth largest producer of energy has a strong position to be one of a small number of countries to lead the way in fighting climate change. India is targeting to grow renewable energy production fourfold within five years, and with its low-cost base can become a core source of mass-produced cost effective renewable solutions for the rest of the world.

#### Global warming causes extinction

Cummins ‘10 (Ronnie, International Director – Organic Consumers Association and Will Allen, Advisor – Organic Consumers Association, “Climate Catastrophe: Surviving the 21st Century”, 2-14, http://www.commondreams.org/view/2010/02/14-6)

The hour is late. Leading climate scientists such as James Hansen are literally shouting at the top of their lungs that the world needs to reduce emissions by 20-40% as soon as possible, and 80-90% by the year 2050, if we are to avoid climate chaos, crop failures, endless wars, melting of the polar icecaps, and a disastrous rise in ocean levels. Either we radically reduce CO2 and carbon dioxide equivalent (CO2e, which includes all GHGs, not just CO2) pollutants (currently at 390 parts per million and rising 2 ppm per year) to 350 ppm, including agriculture-derived methane and nitrous oxide pollution, or else survival for the present and future generations is in jeopardy. As scientists warned at Copenhagen, business as usual and a corresponding 7-8.6 degree Fahrenheit rise in global temperatures means that the carrying capacity of the Earth in 2100 will be reduced to one billion people. Under this hellish scenario, billions will die of thirst, cold, heat, disease, war, and starvation. If the U.S. significantly reduces greenhouse gas emissions, other countries will follow. One hopeful sign is the recent EPA announcement that it intends to regulate greenhouse gases as pollutants under the Clean Air Act. Unfortunately we are going to have to put tremendous pressure on elected public officials to force the EPA to crack down on GHG polluters (including industrial farms and food processors). Public pressure is especially critical since "just say no" Congressmen-both Democrats and Republicans-along with agribusiness, real estate developers, the construction industry, and the fossil fuel lobby appear determined to maintain "business as usual."

## 2

#### Space Commercialization is key to Space Deterrence – Commercial Flexibility is key to deterrence by denial.

Klein 19, John J. Understanding space strategy: the art of war in space. Routledge, 2019. (a Senior Fellow and Strategist at Falcon Research, Inc. and Adjunct Professor at George Washington University’s Space Policy Institute)

Recent U.S. space policy initiatives underscore the far-reaching benefits of commercial space activities. The White House revived the National Space Council to foster closer coordination, cooperation, and exchange of technology and information among the civil, national security, and commercial space sectors.1 National Space Policy Directive 2 seeks to promote economic growth by streamlining U.S. regulations on the commercial use of space.2 While the defense community generally appreciates the value of services and capabilities derived from the commercial space sector—including space launch, Earth observation, and satellite communications—it often overlooks one area of strategic importance: deterrence. To address the current shortcoming in understanding, this paper first describes the concept of deterrence, along with how space mission assurance and resilience fit into the framework. After explaining how commercial space capabilities may influence the decision calculus of potential adversaries, this study presents actionable recommendations for the U.S. Department of Defense (DoD) to address current problem areas. Ultimately, DoD—including the soon-to-be reestablished U.S. Space Command and possibly a new U.S. Space Force—should incorporate the benefits and capabilities of the commercial space sector into flexible deterrent options and applicable campaign and contingency plans. Deterrence, Mission Assurance, and Resilience Thomas Schelling, the dean of modern deterrence theory, held that deterrence refers to persuading a potential enemy that it is in its interest to avoid certain courses of activity.3 One component of deterrence theory lies in an understanding that the threat of credible and potentially overwhelming force or other retaliatory action against any would-be adversary is sufficient to deter most potential aggressors from conducting hostile actions. This idea is also referred to as deterrence by punishment.4 The second salient component of deterrence theory is denial. According to Glenn Snyder’s definition, deterrence by denial is “the capability to deny the other party any gains from the move which is to be deterred.”5 The 2018 U.S. National Defense Strategy (NDS) highlights deterrence, and specifically deterrence by denial, as a vital component of national security. The NDS notes that the primary objectives of the United States include deterring adversaries from pursuing aggression and preventing hostile actions against vital U.S. interests.6 The strategy also observes that deterring conflict necessitates preparing for war during peacetime.7 For the space domain, the peacetime preparedness needed for deterrence by denial occurs in the context of space mission assurance and resilience. Mission assurance entails “a process to protect or ensure the continued function and resilience of capabilities and assets—including personnel, equipment, facilities, networks, information and information systems, infrastructure, and supply chains—critical to the performance of DoD mission essential functions in any operating environment or condition.”8 Similar to mission assurance but with a different focus, resilience is an architecture’s ability to support mission success with higher probability; shorter periods of reduced capability; and across a wider range of scenarios, conditions, and threats, despite hostile action or adverse conditions.9 Resilience may leverage cross-domain solutions, along with commercial and international capabilities.10 Space mission assurance and resilience can prevent a potential adversary from achieving its objectives or realizing any benefit from its aggressive action. These facets of U.S. preparedness help convey the futility of conducting a hostile act. Consequently, they enhance deterrence by denial. Commercial Space Enables Deterrence The commercial space sector directly promotes mission assurance and resilience efforts. This is in part due to the distributed and diversified nature of commercial space launch and satellites services. Distribution refers to the use of a number of nodes, working together, to perform the same mission or functions as a single node; diversification describes contributing to the same mission in multiple ways, using different platforms, orbits, or systems and capabilities.11 The 2017 U.S. National Security Strategy, in noting the benefits derived from the commercial space industry, states that DoD partners with the commercial sector’s capabilities to improve the U.S. space architecture’s resilience.12 Although U.S. policy and joint doctrine frequently acknowledge the role of the commercial space sector in space mission assurance and resilience, there is little recognition that day-to-day contributions from the commercial industry assists in deterring would-be adversaries. The commercial space sector contributes to deterrence by denial through multi-domain solutions that are distributed and diversified. These can deter potential adversaries from pursuing offensive actions against space-related systems. Commercial launch providers enhance deterrence by providing options for getting payloads into orbit. These include diverse space launch capabilities such as small and responsive launch vehicles, along with larger, reusable launch vehicles; launch rideshares for secondary payloads; and government payloads on commercial satellites. Various on-orbit systems also promote deterrence. For example, if an aggressor damages a commercial remote sensing satellite during hostilities, similar commercial satellites in a different orbital regime, or those of the same constellation, may provide the needed imagery. If satellite communications are jammed or degraded, commercial service providers can reroute satellite communications through their own networks, or potentially through the networks of another company using a different portion of the frequency spectrum. Regarding deterrence by punishment efforts, the commercial space sector can play a role, albeit an indirect one, through improved space situational awareness (SSA) and space forensics (including digital forensics and multispectral imagery). The commercial industry may support the attribution process following a hostile or illegal act in space through its increasingly proliferating network of SSA ground telescopes and other terrestrial tracking systems. The DoD may also leverage the commercial space sector’s cyber expertise to support digital forensic efforts to help determine the source of an attack. By supporting a credible and transparent attribution process, commercial partners may cause a would-be adversary to act differently if it perceives that its aggressive, illegal, or otherwise nefarious actions will be disclosed. Doing so can help bolster the perceived ability to conduct a legitimate response following a hostile attack, which may improve deterrence by punishment efforts. Commercial space capabilities may also facilitate the application of force to punish a potential aggressor. In addition to traditional military space systems, commercial satellite imagery and communication capabilities may be used in cueing and targeting for punitive strikes against an aggressor. Although the commercial space sector is not expected to be involved directly in the use of retaliatory force following a hostile act, commercial partners may help in providing the information used to identify those responsible and to facilitate any consequent targeting efforts.

#### Space Deterrence Breakdowns causes War and Extinction.

Parker 17 Clifton Parker 1-24-2017 “Deterrence in space key to U.S. security” <https://cisac.fsi.stanford.edu/news/deterrence-space-key-us-security> (Policy Analyst at the Stanford Center for International Security and Cooperation)

Space is more important than ever for the security of the United States, but it’s almost like the Wild West in terms of behavior, a top general said today. Air Force Gen. [John Hyten](http://www.af.mil/AboutUs/Biographies/Display/tabid/225/Article/108115/general-john-e-hyten.aspx), commander of the U.S. Strategic Command, spoke Jan. 24 at Stanford’s [Center](http://cisac.fsi.stanford.edu/) for International Security and Cooperation. His [talk](http://cisac.fsi.stanford.edu/events/us-strategic-command-perspectives-deterrence-and-assurance) was titled, “U.S. Strategic Command Perspectives on Deterrence and Assurance.” Hyten said, “Space is fundamental to every single military operation that occurs on the planet today.” He added that “there is no such thing as a war in space,” because it would affect all realms of human existence, due to the satellite systems. Hyten advocates “strategic deterrence” and “norms of behavior” across space as well as land, water and cyberspace. Otherwise, rivals like China and Russia will only threaten U.S. interests in space and wreak havoc for humanity below, he said. Most of contemporary life depends on systems connected to space. Hyten also addressed other topics, including recent proposals by some to upgrade the country’s missile defense systems. “You just don’t snap your fingers and build a state-of-the-art anything overnight,” Hyten said, adding that he has not yet spoken to Trump administration officials about the issue. “We need a powerful military,” but a severe budget crunch makes “reasonable solutions” more likely than expensive and unrealistic ones. On the upgrade front, Hyten said he favors a long-range strike missile system to replace existing cruise missiles; a better air-to-air missile for the Air Force; and an improved missile defense ground base interceptor. ‘Critically dependent’ From satellites to global-positioning systems GPS, space has transformed human life – and the military – in the 21st century, Hyten said. In terms of defining "space," the U.S. designates people who travel above an altitude of 50 miles as astronauts. As the commander of the U.S. Strategic Command, Hyten oversees the control of U.S. strategic forces, providing options for the president and secretary of defense. In particular, this command is charged with space operations (such as military satellites), information operations (such as information warfare), missile defense, global command and control, intelligence, surveillance, and reconnaissance, global strike and strategic deterrence (the U.S. nuclear arsenal), and combating weapons of mass destruction. Hyten explained that every drone, fighter jet, bomber, ship and soldier is critically dependent on space to conduct their own operations. All cell phones use space, and the GPS command systems overall are managed at Strategic Command, he said. “No soldier has to worry about what’s over the next hill,” he said, describing GPS capabilities, which have fundamentally transformed humanity’s way of life. Space needs to be available for exploration, he said. “I watch what goes on in space, and I worry about us destroying that environment for future generations.” He said that too many drifting objects and debris exist – about 22,000 right now. A recent Chinese satellite interception created a couple thousand more debris objects that now circle about the Earth at various altitudes and pose the risk of striking satellites. “We track every object in space” now, Hyten said, urging “international norms of behavior in space.” He added, “We have to deter bad behavior on space. We have to deter war in space. It’s bad for everybody. We could trash that forever.” But now rivals like China and Russia are building weapons to deploy in the lower levels of space. “How do we prevent this? It’s bigger than a space problem,” he said. Deterring conflict in the cyber, nuclear and space realms is the strategic deterrence goal of the 21st century, Hyten said. “The best way to prevent war is to be prepared for war,” he said. Hyten believes the U.S. needs a fundamentally different debate about deterrence. And it all starts with nuclear weapons. “In my deepest heart, I wish I didn’t have to worry about nuclear weapons,” he said. Hyten described his job as “pretty sobering, it’s not easy.” But he also noted the mass violence of the world prior to 1945 when the first atomic bomb was used. Roughly 80 million people died from 1939 to 1945 during World War II. Consider that in the 10-plus years of the Vietnam War, 58,000 Americans were killed. That’s equivalent to two days of deaths in WWII, he said. In a world without nuclear weapons, a rise in conventional warfare would produce great numbers of mass casualties, Hyten said. About war, he said, “Once you see it up close, no human will ever want to experience it.” Though America has “crazy enemies” right now, in many ways the world is more safe than during WWII, Hyten said. The irony is that nuclear weapons deterrence has kept us from the type of mass killings known in events like WWII. But the U.S. must know how to use its nuclear deterrence effectively. Looking ahead, Hyten said the U.S. needs to think about space as a potential war environment. An attack in space might not mean a response in space, but on the Earth. Hyten describes space as the domain that people look up at it and still dream about. “I love to look at the stars,” but said he wants to make sure he’s not looking up at junk orbiting in the atmosphere.