

## **INTERACTIVE THINK-TANK ON SPACE**

**VIF-2022**

### **Theme:**

#### **INDIA'S SPACE VISION@2047**

(DELIBERATING ACTIONABLE STRATEGIES & CREATING OPPORTUNITIES FOR THE INDIAN SPACE SECTOR)

### **Introduction:**

It has been ISpA's aim to create a robust private Indian Space Ecosystem that supports our government, industry, and citizens. Special efforts are being made to provide full support to Startups to power the 'Atma Nirbhar' Initiative in the Space Sector with a focus on strategic, self-reliance and building niche technological capability. As an extension of these efforts, ISpA has organized the first interactive Think-Tank on the theme of "INDIA'S SPACE VISION@2047", under the aegis of VIF.

This initiative aimed to articulate India's Space aspirations and discuss actionable strategies for the development of the Indian Space and Defence Sector. The goal was to stimulate a discussion about how the Indian Space Industry fares on the global stage and the role of private entities in this process. To get a 360-degree perspective, the speaker and participants were invited/selected from a wide canvas to include diplomats, eminent academia members, space law experts, government representatives, and defence agencies. They shared their ideas and insights in an open, insightful, and constructive atmosphere. The hybrid model of the event allowed participants to join the discussion virtually and contribute their perspectives on the matter.



## **Introductory Sessions:**

### **1. Dr Arvind Gupta (Director, Vivekananda International Foundation):**

To set the stage for discussion, he stated “In the last couple of years, the government has opened up Space for private players. One of the most important aspects in my view would be the need for International Cooperation. India is one of the few countries with significant capabilities in space, but other countries that are equal or more significant, are the US, Russia, Japan, South Korea and some others. We need to involve in projects and partnerships with them. Today every country wants to have some investment in space. Space technologies are ubiquitous. I think the Indian Space industry should not just be confined only to India, but as it has the capabilities, it should look for opportunities abroad. And I

would certainly single out South Asia, which is in our neighbourhood and Africa, where we have robust engagements supported by the government. We can talk about a lot of ideas but essentially much will depend upon what are the actual technological and commercial capabilities of the Indian Space companies.”

“So far, it was the ISRO which dominated the space technologies in India and it is still doing so, ISRO of course over the years has nurtured many private companies in the space sector and developed great capabilities. But essentially, the private industries were contractors/suppliers who manufactured on specific jobs they were given, but now, we will have to develop individual capabilities in a whole lot of areas. The Indian Space industry may have to look at the R & D aspects, design & manufacturing. The standard in outer space is governed by international agencies; therefore we also need to concentrate on global norms and laws. The Indian space industry has to be aware of the obligations that it has to undertake when it goes into international cooperation, and also international commerce in this case.”

“The needs of the Indian Armed Forces in Space are all Strategic technologies, which nobody is going to give. These will have to be developed mostly within the country. Of course, you can have some partnerships but essentially, these high-end technologies must be developed in-house very quickly. As the world is going through very turbulent times and the next 10 years are going to make or break us.”

**2. Mr JD Patil** (Whole Time Director & Senior Executive VP L&T and Chairman, ISpA):

Focusing on the current ISRO’s working model, Mr Patil said, “Since the sector remained reserved, what did not happen with the ISRO’s model, is that there was no system capability for private industry to understand what is required for launching something or monitoring everything which is there in space. Announcements of opening the Space industry to private players certainly happened about 1.5 to 2 years back. Still, the policies that are required to support

the sector are not yet available and are yet to be released. The law which essentially needs to be modified through the Parliament is a 'work in progress ."

"We know that the ISRO used to focus only on R&D, they don't get into every other aspect of the space lifecycle, beyond R&D, space exploration, and futuristic things. But the Programs/projects are executed, a little differently, this difference is seen in DRDO which has research as well as a Program arm. In ISRO we noticed that in every aspect of business, right from fundamental research, and exploration of space to the provision of services, everything was under one house. When the sector opening began, ISRO was supposed to be doing one part of the role, but what has happened is that the moment there is a disruption, everything comes to a standstill."

"Every entity coming up in space sectors, including startups and the existing 200 industries (approx.) that exist in the country, works with ISRO, but all of them have a subsystem or component level capability. Whenever ISRO has some challenges, the collaboration between the Department of Space and private players can create any required capability in India. The radars which we talk of in defence- a radar having single digit accuracy in meters, over a few thousands of kilometres, is something space industry could use."

"Today, we assemble everything at the launch station, but if we can do this in industry and take the whole product to the launch station, we can launch maximum space vehicles every year. Today, the private sector cannot truly do anything in this sector, without actually going to ISRO and that's where we can see a synergy that can truly be built."

"Today we are roughly 2% of the global space GDP, the primary reason is not capability gap, we could have done far more in space commerce. If the synergy between space and the IT sector works out, we believe we can certainly do anywhere beyond 25% of the global space GDP, in the coming 25 years."

**3. Lt. Gen. AK Bhatt (Retd) PVSM, UYSM, AVSM, SM, VSM** (Director General, ISpA):

Speaking about the present landscape in India, He stated -

### **Recent Development in space:**

“Historically, space has been a strategic sector and developments were triggered in the 1940s. It was the cold war rivalry which resulted in a rocket being fired, a satellite being launched, and a man being sent to space or a man being sent to the moon. What happened recently was, around the early 90s, the first time the US declared a policy for opening space for the private sector. But it was around the year 2000, when players like Starlink, Virgin Galactic and others, started coming into the space domain. But what happened, more importantly, was the advent of disruptive technologies. Reusable rockets have brought the price of launching a rocket to 1/5th. Small satellites and LEO constellations, which were never thought of for communication, will lead to broadband very soon.”

“There has been enhanced commercialization. What all primary space was used for, a few decades back was for militaries all over, but now it is more and more used by the private sector. Be it communication, remote sensing, navigation and even SSA, this has made the space more congested.”

“One very interesting thing is the race to join space by many non-space faring nations. Listed today are about seven space-faring nations, previously we all knew 6 which included India but the other two they now talk of are Israel and Iran. But 92 countries have some interest and about 75 have launched at least one satellite (Some other countries may have launched for them, but they own the satellite). In the future, near the horizon is space tourism. We have seen the initial phase of that with the launch by Virgin Galactic, Blue Origin and Starlink.”

### **Indian Space Environment**

“What has happened in India is that the entire space has been led by ISRO for 60 years. They have evolved from sounding rockets to missions to the moon and mars, which are significant achievements for India. Indian industry has primarily been a supplier of components, assemblies, and sub-assemblies.”<sup>2</sup>

**Privatisation of Space:**

“Things which have triggered the privatisation of space, one would be the global trends. What was happening in India was that there was a large spectrum of activities that ISRO was looking after, from allocation of frequency bands to launching a spacecraft to Mars. There were certain commercial activities which could easily be given to industry or the public sector, as has been done to NSIL. India’s space economy is just 2.3% to 2.6% of the global economy which is approximately 440 billion dollars today. Being a space-faring Nation, our global share was much below the desired level.”

“It was felt by the government that it was an opportunity like IT and pharma, Most importantly we have a very large talent pool in India, which was going abroad because of lack of opportunities in space domain in India. Startups in India started much before the government of India launched the policy of privatisation.”

**Key Enablers for Privatisation of Space:**

“World over, the defence has been the largest user of space. In Feb 2020 government decided to combine the three existing enabling policies and issue one single space policy. For privatisation in space, it would be essential to enable organisations and structures, light touch policies and regulations, creation of an ecosystem which requires space parks/SEZ’s, assured market demand and the financial support.”

“In India, despite the policy not coming, there are many companies in taking who have taken a leap of faith of creating infrastructure and would be ready to take orders as soon as the Policy comes out. Our startups have taken the challenge of going into the most challenging part of rocket science and space, that is, rockets and satellites itself.”

“The investment by seed funding and venture capitals is enough for Startups to keep working, but to go into the business and expand, much more financing is required. There are some challenges, such as regulatory voids, non-availability of

testing facilities, and manpower challenges due to a lack of assured market demand. Also, import of optical components and support in the creation of intellectual property need to be addressed.”

“ISpA’s role and vision emanate from what was required to create an ecosystem in India. As visualised by Prime Minister, the Government has to be the enabler, the industry has to be allowed to innovate, we have to build capacities for the future and Space has to be there for the common man. The focus areas of ISpA is to work in close coordination of ISRO, IN-SPACE and NSIL.”

“Talking about what we expect in future, it is envisioned that by 2060, thousands of individuals will live and work in Lower Earth Orbit (LEO). There would be an increased human presence in space which supports civil, commercial, and military needs and interests. There would be one or more crew bases on the moon, crewed habitats across the space supporting logistics for various activities, habitats on moon and mars.”

“Talking about the commercial part in the same domain, space would contribute at least 10% of global GDP, major industrial activities like resource extraction and manufacturing will take place in space and space tourism will become a major industry.”

“We as a Nation have to be future ready for this emergency.”

#### **4. Wing Cdr. Satyam Kushwaha (Retd)** (Director, ISpA):

“ISpA’s vision would be to leverage space for India's prosperity and security. For this our goals should be to make India, the world's leading economic power with a developed, prosperous and digitally enabled society where the space domain is ensured to be safe, secure, and freely accessible. And for this, the most important aspect is that it cannot just be the space industry, but the whole of the nation’s approach has to be applied to achieve this stated objective. For that, our mission needs to be, to grow India as a comprehensive space power to secure our nation’s vital interests. For this, we will need to take certain definitive steps to make India the hub of global space power. We will need to leverage the strengths of both ISRO

as well as our industry, in delivering the products, which meet our national aspirations. There will be a concerted effort required to facilitate our industry and our international cooperation.

“To address the current gaps, a robust and agile private space industry is essential as the government has limited resources. We will need to take a very long-term view of it and not just a transactional view about sourcing something from the industry to solve some government requirements. The capabilities of our adversaries are already building up and challenging our ability to leverage space, we have a set of reforms which have been put into action, but they must gather pace. To be able to match the speed that is required to put our industry into definitive action we require a lot of handholding.”

“By 2047, Space would become the central aspect of India's digital revolution. We expect that our entire population will be covered by satellite-based seamless, secure, high-speed broadband available for both enterprises as well as for the public. We would see enhanced utilization of space in areas of governance, telemedicine, education, tourism, and enterprise-related work and we would see a large number of constellations coming out from the industry. To support PNT operations, remote sensing, as well as the government-related offensive and defensive capabilities, and the cyber domain, there are some unique aspects, which we need to understand concerning the space industry.”

“The most unique aspect about the space sector is that it is a dual-use sector, it requires a huge amount of investments, the industry needs to access very critical testing validation facilities and the risk of failure is very high. If we look at space innovation and consumption side, the key aspects are IPR protection, policy stability, user-maker connection, technology, clarity of user requirement and sustainable/scalable business models. To create a demand in the space industry, we need to focus on, mandating the use of geospatial technology and space with technologies for project management, execution, and monitoring.”

“The challenges that come in creating demand are limited budgetary resources, domain expertise within departments, adoption and absorption issues, and data

issues like the ones we have in geospatial data. The satellite constellations we are making today can be used for both military and commercial purposes. There is no big difference between the requirements of the defence sector and the commercial sector. We need to apply the one nation approach, we can make a model where government pools initial resources to enable the first infrastructure and after that, we use private sector funding to scale it up.”

**5. MR. Kranthi Chand** (Head Strategy, Dhruva Space.):

“One of the big steps after the policy changes that we have seen is the set of authorizations that came out from IN-SPACe for us to put objects in space. On the 30<sup>th</sup> of June 2022, we completed a milestone by putting the satellites of two private startups, into space that too using ISRO’s platform. Startup in India is not a new phenomenon but part of the ecosystem we are targeting has changed. It is very crucial to understand that, there are 400-800 MSMEs who had been working and providing service to ISRO.

“We've looked at multiple entities, which have been procuring things. At the end of the day, it's not looked like the Indian Navy procures, AIS data from an international vendor but at the same time, the DRDO build its satellite, which was doing AIS data. We have ISRO missions that have secondary payloads as AIS data. But the Directorate General of Lighthouse and Shipping do not get AIS data from anyone. They have set up radars across the country, while they get only a limited part of that information. How do we bridge those gaps?

72 radar stations across different coastal areas, and getting the same information, which could be brought in from the satellites, which we are already procuring as data sets. So, the idea is - To expand the usage and how the interdepartmental are already using the same data sets, but are not working together. I think that's very important for us to solve the problem.”

“There's a circular economy that is created by different departments who are trying to encourage the participation of private industry in their capacities in the space sector to collate and create the market. The market is there, it is just that

we've not seen it yet and I think that is more important to recognize - what are the markets, what are the purchases that are done, bifurcate in certain cases to build more small satellites, and bring in that change.”

“The change in the space industry is now being driven by intellectual property that is being created outside of the space agencies. India owns about 56 space assets, to take the lead in this section, commercialization of assets is required. A circular economy is essential for government and private industries for the development of the Indian space economy. To create unicorns in this industry, we need to follow the fintech approach.”



## **Open Interactive Session**

**1. Ambassador Arun Singh (Retd), IFS** (Distinguished Fellow, VIF and Former Ambassador to US, France & Israel):

“We need to energize private sector cooperation at the international level. We can look at joint funding between India and the US for a project where there is a joint participation of entities from both countries.”

**2. Dr VK Dadhwal** (Faculty, NIAS.):

“Opportunities are limited in the space communication domain due to the involvement of big industries. Making partnerships with Master’s and PhD institutions is important for the development of the sector. Also, we need to open geospatial mapping and high-resolution images to the private entities.”

**3. Dr Siddharth Shekhar Singh** (Associate Professor, Marketing, ISB Mohali.):

“Proper branding of the Indian Space industry is required for it to be a global leader. We cannot rely on the casual attitude of letting the market forces effect changes for a brand. Indian industry should work on customer-centric marketing, inconsistent approaches will not produce the right outcomes. The space-to-space technology segment is not much explored. India can take a stand on it. Hurdles in commercialization, adoption and R&D need to be removed to become a world leader.”

**4. Dr Ranjana Kaul** (Partner, Dua Associates):

“All the gaps that have been identified, regulatory laws and frameworks are an impediment. The connection of all related laws will go into making successful ground segment and space activities. Implementation of the policy is another important aspect, the policy must be accompanied by a roadmap for implementation. Space will always remain a military domain, commercial use would remain a subset. The Space Activity Bill needs to ensure that military dimensions are addressed and not overlooked. India is the only country which had established its National Space programme as the civil programme.”

**5. Dr VS Hedge** (Former, Outstanding Scientist and Scientific Secretary, ISRO and Former, CMD of Antrix Corporation Limited):

“Need of the hour is to enable our private industry to quickly focus on the Space to earth economy. Directly jumping into outer space is difficult for our industry. It is necessary right now that the technology transfer, which ISRO is talking about, should focus on giving away all these systems and subsystems level technology to those industries which are manufacturing them. This should be done at practically no nominal cost. Most of the startups in India want to make the complete Satellite, which is a waste of energy. Brilliant young minds should focus on developing some disruptive technology, instruments, payload and not waste their time on developing satellite buses.”

“What is required ultimately is to become an intellectual power in this area. It is to develop as many disruptive payloads, technology and analytical tools. Global technology partnership and indirectly infusing the heritage components into the industry is must to become a global power.”

**6. Mr Vishnu Chandra** (Former Deputy Director General & HOG -NIC(Geo-Spatial Technology Services Division, MohuA, MoEFCC, Power, MNRE, NDMIS & IPR), Hydrospatial ):

“Paradigm shift in data governance is required. Private industries should be provided with the required data. Different systems and technology components should interpolate and the interpolation standards to create systems and subsystems, are very important. Workflow using multiple sectors, specialities and security is required. Involvement of the private sector in domain-focused capacity building will make a great impact. Incubation with private institutions on the ground will be helpful.”

**7. Dr Sudheer Kumar N** (Director, CBPO ISRO):

“The requirement of optional space technology for real applications is huge, but the problem area is, who is the user. An interface is required to be created between agencies and users to make users aware of the technology. ISRO expects ISpA will play an important role in creating the required space ecosystem in India.”

**8. Air Vice Marshal DV Khot** (AVSM, VM, DG DSA, HQ IDS):

“Military expects to benefit from the private sector and its products. We need to bridge the security gaps to allow the military to consume private products. We are not used to managing instabilities, we need proper policy, models and instruments to handle this. We lack a common view, we need to dismantle existing structures and start in a manner in which we take a leap of faith.”

“Military and strategic views are not included in the policies, these are the areas we need to work upon. We also need to focus on purpose-driven R&D funding. There is a huge scope in the ground segment with minimum investment, the private sector should consider this area.”

**9. Dr Vinod Kumar** (Director IN-SPACE, Executive Secretary ASI):

“The idea of a demand-driven model by the government is amazing, and for this idea to work, we need to create a demand for technology. The common man has been using space technology in various things but doesn't know about it. We need to educate people regarding space technology, which will affect the demand for technology. Decision-making is taking more time than implementation, the Indian government has been working on this. Another thing required to increase the market share of India in the global market is quick decision making, which we lack .”

**10. Dr Ranjana Nallamalli**, (Scientist 'G' Director, Directorate of Systems and Technology Analysis (DSTA), DRDO):

“Standardization is something, which is to be thought of up front in space growth and without that, it is not possible. Artificial Intelligence(AI) is going to be the main player in target detection and geospatial activity using satellites. AI models are being shared, but we need to benchmark the data we get from them. Other countries are highly concentrating on standards, we also need to work on and monitor standards for space applications. We need to bring out a framework where you can build these standards in a very consortia way, which applies to everyone.”

**11. Lt Gen Vinod G. Khandare (Retd),** (PVSM, AVSM, SM, Senior Advisor MoD Former Military Advisor, NSCS, Former DG DIA & DCIDS(Int), HQ IDS):

“When it comes to the security sector, successions will not serve the purpose. As it was easy for ISRO to launch heavy satellites, we missed about 2 to 4 technology cycles. We need to have a circular economy with a vertical attitude with an individual approach for the development of the space economy. A professional agency is needed to be hired to map out the demands.”

## **EVENT SUMMARY**

The Indian space sector has the potential to expand multifold as a percentage of the world space economy in the following 25 years. However, this goal is largely contingent on the growth of the private sector. In India, entering the space sector as a private player is a huge risk that many have willingly taken. This demonstrates the vitality of our space sector and the urgent need for augmenting it further through informed policy decisions. The defence has been the biggest consumer of space, and the creation of DSI has made it simple for the space industry to contribute to national security. The roles and duties between DRDO, ISRO, and the Private Space Industry should be clearly defined to create a functional relationship between the military and the space sector. As pointed out by the esteemed defence expert in the session, the military anticipates gaining from the private sector and its goods, but to do so, it must first close any security

gaps. This requires strong policy, models, and tools. Policies often fail to take military and strategic perspectives into account.

The importance of a circular economy between public and commercial sectors was underscored in the session as a means of achieving progress. Technology transfers from ISRO can open new frontiers for us. Geospatial mapping and high resolution to the private entities would be a step in this direction. Supplementing this, the usefulness of a demand-driven model was also discussed. Market dynamics alone cannot proliferate demand. Demand has to be generated. The average person has been using space technology for a variety of purposes, but they are unaware of it. People need to be made aware of space technology since this will change how much technology is demanded. The Indian manufacturing sector must focus on customer-centric marketing; a fragmented strategy will not succeed. To become a global leader, obstacles in commercialization, adoption, and R&D must be addressed. Most private companies have subsystems or component-level skills, but for an industry to flourish, entities must begin working on the entire product. Private sector cooperation at the international level should also be considered. Collaboration between private entities of India and other countries can be mutually beneficial. It can introduce us to new technologies and different strategies. Finally, an important message that emerged from the session was a plea to the young minds to develop disruptive technology, instruments, and payloads instead of following the trend.

**A glimpse of the event:**



