

*International Seminar on*

# INDIAN SPACE PROGRAMME

TRENDS & OPPORTUNITIES FOR INDUSTRY

NOVEMBER 20-21, 2017

NEW DELHI

## RECOMMENDATIONS



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The document is compiled on the basis of the proceedings and key recommendations from the 1st International Seminar on Indian Space Program: Trends and Opportunities for Industry, jointly organised by FICCI and ISRO, on November 20-21, 2017 at New Delhi.

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# Foreword



**Dr. Sanjaya Baru**  
Secretary General, FICCI

**H**on'ble Prime Minister, while lauding the achievements of Indian Space Community for placing India in the elite club of space faring nations outlined his vision to dedicate ourselves to accelerate nation's growth in space with scale, speed and skill. He, further underscored the need for peaceful uses of outer space not only for 125 Crores Indians but also for all of mankind in the very Indian ethos & tradition of "Vasudaiva Kutumbakam". He stressed that we need to do more. For us in FICCI it became not only an inspiration but a mission to bring ISRO, Dept. of Space (DoS), Indian and international stakeholders on common platform to realize the vision of the Prime Minister.

This motivation gave rise to setting up of a new space division at FICCI that is exclusively assigned the role to interact with Indian and international stakeholders, inclusive of government, industry, space thought leaders and academia to foster relationships and opportunities, with a view to stimulate the environment for accelerated growth to meet our national aspirations.

It is in this context that the **"1st International Seminar on Indian Space Programme: Trends & Opportunities for Industry"** was organized during November, 20-21, 2017 at New Delhi by FICCI, in association with ISRO and its commercial arm Antrix Corporation Ltd. The seminar was very well attended by large number of stakeholders from across the spectrum. The biggest achievement of this seminar was that it brought together India's leading scientists, industrial partners and key government functionaries in a frank and open discussion on the unique challenges and opportunities available for India to leap frog its industrial capabilities in the space sector.



At the seminar, it emerged that collaboration is the key for exploiting the immense potential of space for mankind. The seminar offered several recommendations pertaining to various segments of space endeavours. These will be followed up by FICCI in close coordination with ISRO/DoS.

I would like to place on record the support of Shri Kiran Kumar, Chairman, ISRO, Dr VS Hegde, Prof. Satish Dhawan Professor and Former CMD, Antrix Corporation Ltd and Shri Rakesh Sashibhushan, CMD, Antrix Corporation Limited to the FICCI team. We cherish our association with ISRO and Antrix Corporation. I thank all industry delegates and our partners for supporting this maiden initiative of FICCI.

With best wishes and regards

A handwritten signature in black ink, appearing to read 'Sanjaya Baru'.

**Dr Sanjaya Baru**



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# Background

The Indian Space Programme has reached a significant milestone with 158 missions that include 64 launch vehicles, 2 re-entry missions and 92 satellites. The PSLV and GSLV launch vehicles have enabled India to surge towards becoming self-reliant in launching the different class of spacecraft built in the in-house. India's successful maiden missions to the Moon and Mars, the Chandrayaan-1 and the Mars Orbiter spacecraft respectively; the spectacular achievement of country's heavy-lift launcher GSLV Mk-III that placed GSAT-19 communication satellite into orbit in its very first flight; dedicating an exclusive satellite built in-house and also launched from India to the neighbouring South-Asian countries for societal development; the state-of-the-art ground-infrastructure associated with country's space program, established over years and across the country; the multitude of applications developed and operationalized for management of country's natural resources, monitoring environment, meteorology and weather studies, tele-communication, television broadcasting, navigation and disaster mitigation; continued pursuit of space research; and above all, contributing to societal development through country's expanse; and 42 satellites for Earth Observation, Communication, Navigation, Space Science and Planetary research - currently working up-in-space; make India, which is already in the elite club of space-faring nations of the world, enviable.

ISRO has steadily expanded its capability in building and launching satellites and developing the plethora of space applications benefiting the society, while continuing to pursue research in space science and technology. The milestones achieved by ISRO have constantly motivated the Indian industry, especially the Aerospace Companies, who are willing to expand their business in space sector.

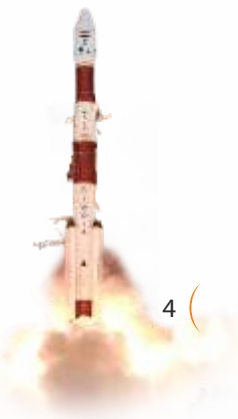
From the beginning, ISRO has practiced a conscious policy of building and nurturing the capabilities of domestic industry so that they maximally support the Indian Space Program. While industry has been delivering hardware, ISRO has been playing the lead with regard to designing the mission, assembly, testing, quality assurance, integration and launching. The Indian Space Program has since attained a commendable level of standardization and technical maturity, and is considered ready for encouraging the domestic industry to assume higher levels of engagement in the space sector.



Considering the future space missions of the country and research and development activities in space science and technology, ISRO has proactively begun to look for enhanced industry participation to meet the consequent demands.

The global satellite industry encompasses satellite services, satellite manufacturing, launch industry and ground equipment. It is seen that as of year-end 2015, there have been over 1300 operating satellites, of which 50% are communication satellites. Nearly 60 countries operate satellites as of now. Specifically notable, in recent time, a number of private ventures have come-into space arena bringing-in a variety of satellite constellations as well as space-based services.

The new satellite constellations on anvil coupled with growing demand for small satellites are fueling the need for increased manufacturing of various components and sub-systems; further, the requirements for reliable launches. While a few countries have already geared-up to face the challenges and opportunities thrown by the current global space market; it is essential that Indian Space Program and stakeholders mobilize their resources to take benefit of the scenario, in partnerships with foreign industry as deemed necessary, in a way that is beneficial to all.





# The Seminar, its Objectives and Conduct

It is in this backdrop, the "**1<sup>st</sup> International Seminar on Indian Space Programme: Trends & Opportunities for Industry**" was organized during 20-21 November 2017 at New Delhi by FICCI, in association with ISRO and ISRO's commercial arm Antrix Corporation Ltd (Antrix).

The objective of this two-day event was to deliberate on the best practices, pursue the ongoing discussion process to support further work of India's Space Sector and facilitate arriving at a coherent framework, wherein India's space sector could seek enhanced engagement in domestic and global opportunities through partnerships and collaborations. The seminar highlighted the achievements and major milestones of the Indian Space Programme and the future plans.

The event provided a platform to deliberate and brainstorm on the multi-dimensional aspects of space collaboration among various stakeholders in the presence of senior officials of ISRO fraternity; Indian space industry; foreign space agencies from Japan, Russia and Singapore and Thailand; and Space industries from Canada, France, Germany, Israel, Sri Lanka, Thailand, UK, Ukraine and USA. A few diplomats from foreign missions in India also participated in the event to understand the Indian Space Programme, and opportunities for their industry. The stakeholders from industry, policy makers, thought leaders and academia, along with those from ISRO fraternity held discussions on the enabling and encouraging steps taken by the Indian Government vis-à-vis opportunities in the Indian Space Programme; and further, the prospects in the larger space ecosystem. In all, over 275 delegates participated in the seminar.

The deliberations of seminar included themes addressing: **(i) Space Industry Ecosystem: Role and Opportunities for Industry, (ii) Leveraging Public-Private Partnership for Indian Space Programme, (iii) Capacity Building and Talent Management, (iv) Panel Discussion on Role of Industry in Indian Space Programme, (v) International Cooperation in Space Technologies.** The event also gave an opportunity for B2B and B2G meetings giving stakeholders an opportunity to know each other, and discuss possible business avenues.



**ISRO Chairman Shri AS Kiran Kumar** delivered the inaugural address of the seminar. He highlighted the vision of Hon'ble Prime Minister of India in contributing to national development through 'Make in India' and 'Start-up and Stand-up India'. He elaborated on the expectations of ISRO from industry, especially the private sector, in expanding the scope of the sector's value-chain within the space ecosystem.

There were over 30 focussed presentations/ lectures in the seminar, delivered by Senior Members of ISRO fraternity, representatives of foreign space agencies, and foreign and domestic industry and academia. **Member Niti Ayog, Dr. VK Saraswat** chaired the panel discussion on Capacity Building and Talent Management; appreciating the spectacular achievements of ISRO in recent time, stated that the time was now ripe to take-off and extend the capabilities built across the international arena.

**Foreign Secretary Dr. S Jaishankar** gave the valedictory address. He lauded India's achievements and contributions in space sector. He underscored the importance of government and industry working in tandem to realize the vision of Hon'ble Prime Minister, and 'leaving no space between common man and space'. He asked the stakeholders to focus on holistic development taking advantage of the last mile reach provided by space technology; and in this regard, recalled the recent dedication of the South Asia Satellite by India was a matter of great pride reflecting "Neighbourhood First" policy of the country.

**Secretary General, FICCI Dr. Sanjaya Baru**, emphasized on the collaborative approach needed in the space sector across stakeholders at national as well international levels. He underscored the role that FICCI could play in this regard. Further, such event would be planned by FICCI in partnership with ISRO biennially.

# Recommendations

The recommendations emerged in the seminar, as deliberated upon, are listed below:

## A. Baseline Study

1. **Cluster Mapping & Competitiveness Study:** A comprehensive mapping of country's space industry ecosystem and the talent pool to be carried out, involving industry, academia and policy makers, to draw a Perspective Plan for the coming decade, so that industry gears up to take larger share in country's space programme.
2. **Adoption of Best Practices:** Best practices in space sector, globally, to be documented for the benefit of domestic stakeholders.

## B. Policy Level Interventions

3. **Policy and Regulatory Framework:** Congenial policy and regulatory framework to be put-in-place in the country, for private sector to establish space infrastructure, and take up commercial space activities.
4. **Commercialization of Intellectual Property (IP):** IPs in space sector held with ISRO to be made available to industry, through appropriate terms and mechanisms, for commercial exploitation.
5. **Hand-holding of Industry by ISRO:** ISRO to enable industry to move-up the value chain in space activities (from manufacturing components and sub-systems to delivering integrated systems), by way of imparting training as well as hand-holding.
6. **Encouragement to MSME:** Special considerations to be given to MSMEs in the overall value-chain of space activities, associating them with Tier 1 and Tier 2 vendors, foreign and Indian, with access to licensing of technologies, capital and Intellectual Property Rights (IPRs).
7. **Promoting Start-Ups:** In line with the slogan of the Government, 'Start-up India - Stand-up India', government to institute under ISRO a formal 'Space Start-up Incubation Hub', also with involvement of academia.



### C. Supporting Research & Development (R&D)

8. **Supporting R&D in industry:** ISRO to encourage domestic industry to take up R&D activities in space and ground segments activities.
9. **Academia to involve in Translational Research:** To energize Academia-Industry-ISRO collaboration through Centres of Excellence, for academia to work with industry in production-cum-commercial environment.

### D. Infrastructure

10. **Infrastructure Augmentation in Industry:** Industry to augment their infrastructure to support enhanced space activities in the country, i.e., to cater to increased number of launches, satellites and utilization and services roll-out.
11. **Additional Test Facilities:** Private Sector to also invest in establishing ground facilities for Assembly, Integration and Testing (AIT) of space systems.
12. **Access to AIT Facilities, Laboratories and Infrastructure of ISRO:** Industry to be encouraged to utilize the facilities and infrastructure of ISRO, on commercial basis, towards creating a sustainable model of public infrastructure and private sector participation.

### E. Capacity Building and Talent Management

13. **Retaining Talent Pool:** Employees in space sector, from government as well as private, to be provided skill updating and working opportunities through exchange of personnel among allied agencies.
14. **Migration of Personnel from Government to Industry while Technology Transfer:** Personnel working in government to be allowed to shift to industry for involved handholding during technology transfer.
15. **Develop Educational and Outreach Programmes:** Viable talent search programmes to be worked out and instituted, to find and nurture personnel for space sector from early age, for building future workforce for government as well as industry.

## F. Cooperation among Domestic and Foreign Space Industry

16. **Space Diplomacy:** Space diplomacy to be included into Indian Diplomatic effort as part of country's foreign policy to enhance international cooperation in space sector for societal benefit, as well for exploiting commercial opportunities.
17. **Collaboration between Indian and Foreign Space Industry:** To encourage Indian space industry to partner with foreign space industry for bringing newer solutions in space activities, to enable domestic industry to partake in global commercial space activities, while supporting space sector activities in India.

### Next Steps

FICCI will expeditiously follow-up these recommendations in close coordination with ISRO/ Department of Space.



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## About FICCI

Established in 1927, FICCI is the largest and oldest apex business organisation in India. Its history is closely interwoven with India's struggle for independence, its industrialization, and its emergence as one of the most rapidly growing global economies.

A non-government, not-for-profit organisation, FICCI is the voice of India's business and industry. From influencing policy to encouraging debate, engaging with policy makers and civil society, FICCI articulates the views and concerns of industry. It serves its members from the Indian private and public corporate sectors and multinational companies, drawing its strength from diverse regional chambers of commerce and industry across states, reaching out to over 2,50,000 companies.

FICCI provides a platform for networking and consensus building within and across sectors and is the first port of call for Indian industry, policy makers and the international business community.



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