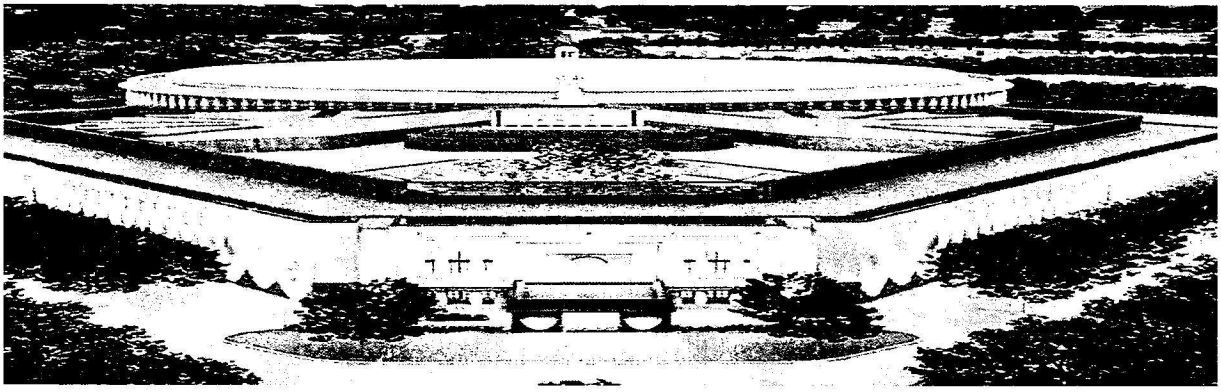
GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

"SPACE IN PARLIAMENT"



WINTER SESSION OF PARLIAMENT 2023
(DECEMBER, 2023)

COMPILATION OF REPLIES GIVEN IN PARLIAMENT DURING 2023

Government of India
Department of Space
****

PARLIAMENT QUESTIONS – WINTER SESSION OF PARLIAMENT 2023
****

INDEX

				private players	
30.	RS	USQ.No.1406	14.12.2023	Deaths of space scientists	73
31.	RS	USQ. No. 2089	21.12.2023	Key objectives of Gaganyaan Mission	74-75
32.	RS	USQ. No. 2211	21.12.2023	Foreign and domestic satellites	76
33.	RS	USQ. No. 2212	21.12.2023	India's space programme	77-78
34.	RS	USQ. No. 2213	21.12.2023	Steps to enhance international collaboration in space exploration	79-81
35.	RS	USQ. No. 2215	21.12.2023	Commercial viability of satellite manufacturing and launching	82
36.	RS	USQ. No. 2216	21.12.2023	Private sector participation in space industry	83-84

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 503

TO BE ANSWERED ON WEDNESDAY, DECEMBER 06, 2023

INSPACe

503. DR. SUJAY RADHAKRISHNA VIKHE PATIL:
DR. HEENA VIJAYKUMAR GAVIT:
PROF. RITA BAHUGUNA JOSHI:
DR. SHRIKANT EKNATH SHINDE:
DR. KRISHNA PAL SINGH YADAV:

Will the PRIME MINISTER be pleased to state:

(a) the projected timeline for INSPACe to formulate a comprehensive regulatory framework policy as stipulated in national space policy;

(b) the timeline and strategy for ISRO's transition away from its current practices as stipulated in the National Space Policy, 2023 and the manner in which the transition is going to affect Indian space industry;

(c) whether the Government has considered as to how any delays in the formulation of the regulatory framework and ISRO's transition is likely to impact the effective implementation of the National Space Policy, 2023;

(d) if so, the contingency plans that are in place to address the potential setbacks; and

(e) whether the Government is considering to grant statutory status to INSPACe for better implementation of National Space Policy, 2023, if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) With the release of the Indian Space Policy-2023, a comprehensive regulatory framework has already been put in place for providing a level playing field to Non-Government Entities in the Space sector through IN-SPACe. Further, detailed directives for implementation of the Indian Space Policy-2023 are being formulated that shall enable stakeholders to interpret the policy and further detail the same.

(b) ISRO's transition away from its current practice as stipulated in Indian Space Policy-2023 has been made in reference towards increasing the role of Indian Industries in the manufacturing of operational space systems and enabling them to commercially exploit mature space systems. Further, ISRO shall focus on R&D in advanced technology, proving newer systems and realization of space objects for meeting national prerogatives.

The above transition in envisaged to widen the national space ecosystem, increase industry participation and enable permeation of technologies from ISRO to the private sector.

(c) The Government has already taken concrete steps towards effective implementation of Indian Space Policy – 2023. With the roles of various stakeholders clearly defined viz. DOS, ISRO, NSIL and IN-SPACe, along with the provision for end-to-end participation in entire value chain of space activities by Non-Government Entities, the space ecosystem is showing signs of expansion, especially in the private sector.

A few recent developments in this regard are provided below:

- **NSIL successfully executed its contract to launch 72 satellites of OneWeb to Low Earth Orbit through LVM3 M2 and M3 missions, respectively.**
- **Launch of Vikram-S (Prarambh mission), a suborbital launch vehicle from M/s Skyroot Aerospace Pvt. Ltd., Hyderabad, was accomplished successfully in November 2022.**
- **First private launchpad & mission control center established by M/s Agnikul Cosmos Pvt. Ltd., Chennai in ISRO campus at SDSC, SHAR.**
- **IN-SPACe launched Seed Fund scheme to provide initial financial assistance to Indian early-stage space start-ups through a grant of up to INR 1 cr. under the scheme, the first**

announcement of opportunity in agricultural sector using space technology was announced in April, 2023

- **In August 2023, ISRO achieved a major feat as Chandrayaan-3 lander, *Vikram*, successfully soft-landed on the Moon. Subsequently, the rover, *Pragyan*, ramped down on the lunar surface.**
- **In September 2023, ISRO launched India's first solar observatory – the Aditya-L1 spacecraft.**
- **In October 2023, ISRO accomplished the first developmental flight of Test Vehicle (TV-D1) with the in-flight abort demonstration of the Crew Escape System (CES). TV-D1 Crew Module was safely recovered from sea with the help of Indian Navy and transported back to ISITE, Bengaluru**

(d) Does not arise.

(e) The Indian Space Policy 2023 clearly defines the roles and responsibilities of all the stakeholders viz. DOS, ISRO, IN-SPACe and NSIL

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 514

TO BE ANSWERED ON WEDNESDAY, DECEMBER 06, 2023

INDIA'S FUTURE SPACE MISSIONS

514. DR. UMESH G. JADHAV:

DR. MANOJ RAJORIA:

SHRI L.S. TEJASVI SURYA:

SHRI NALIN KUMAR KATEEL:

SHRI PRATHAP SIMHA:

SHRI PARVESH SAHIB SINGH VERMA:

Will the PRIME MINISTER be pleased to state:

(a) the details of India's space programmes and missions to be planned and launched in the year 2024 and 2025;

(b) the number of such missions to be spearheaded by ISRO and the organisations that are to lead the other space projects;

(c) the details of the number of Indian Space startups and companies which are working for the development of the space sector and the incentives provided by the Government to assist them; and

(d) the details of the developments and the impact made by the same?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) Space missions planned to be launched during the year 2024 and 2025 include INSAT-3DS, NISAR, RISAT-1B, Resourcesat-3, TDS-01, SPADEX, Oceansat-3A, IDRSS, GSAT-20, NVS-02. Further, test flights under the Gaganyaan Programme and Reusable Launch Vehicle (RLV) are also planned in upcoming years.

(b) All the missions listed above except NISAR are spearheaded by ISRO. NASA-ISRO Synthetic Aperture Radar (NISAR) is jointly being developed by NASA & ISRO.

(c) The total number of startups and companies who have provided their capabilities on IN-SPACe digital platform for space sector as on November 2023 is 523. Out of which 297 have submitted application to IN-SPACe seeking support from ISRO for R&D and testing. With the unlocking of the Space Sector for the private sector by the Government, following support activities are provided to the private sector:

1. Providing mentorship as well as ISRO facility utilization support.
2. Technology Transfer to NGEs.
3. IN-SPACe Seed fund support to startups to transform novel idea into a prototype development.

4. **IN-SPACe Price support for NGEs for utilization of ISRO's facility.**

5. **Creation of IN-SPACe digital platform to connect all the stake holders of space eco system.**

6. **Established IN-SPACe Design Lab, where startups can use high end simulation software for design and analysis of critical space systems/subsystems.**

7. **Skill development in emerging space technology area.**

(d) **The government has announced the Indian Space Policy 2023, which enables end to end participation of NGEs in all domain of space activities. Due to incentives and reform in the space sector, following are the developments and impact:**

1. **The number of Space Start-Ups have gone up, from just 1 in 2014 to more than 200 in 2023.**
2. **The investment in Indian Space Start-Ups has increased to $ 124.7 Million.**
3. **M/s. Dhruva Space, M/s. Pixxel, M/s. Space Kidz launched their own satellites. Many other Space Industries and Start-Ups are also building their own Satellites & constellations. These satellites shall contribute to applications in agriculture, disaster management, environmental monitoring, etc.**
4. **M/s. Skyroot Aerospace Pvt. Ltd. launched their sub-orbital launch vehicle.**

5. **A private launchpad and mission control center established within the ISRO campus for the first time by M/s. Agnikul Cosmos Pvt. Ltd. Sub-orbital launch by Agnikul scheduled shortly.**
6. **Companies like OneWeb, SPACE-X, SES, AWS and others have been exploring satellite-based communication solutions. Private players are increasingly participating in space-based applications and services.**
7. **Satellite integration and testing facilities are coming up in private sector.**
8. **The local manufacturing of the satellite subsystems and Ground systems are being taken up by private sector.**
9. **Indian private space companies are increasingly entering into collaborations and partnerships with international space organizations and companies.**

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 583

TO BE ANSWERED ON WEDNESDAY, DECEMBER 06, 2023

IITians LEAVING ISRO

583. SHRIMATI APARUPA PODDAR:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that the Indian Space Research Organisation (ISRO) is not able to attract IITians because of its pay structure and if so, the details thereof;

(b) the number of students who joined ISRO from IITs, IIMs and other Higher Educational Institutes in the last five years, year and institute-wise;

(c) the main reasons due to which students from IITs, IIMs and other top Higher Educational Institutes are unwilling to join ISRO;

(d) the number of IITians who have left ISRO in the last five years, year-wise; and

(e) the entry level salary of a fresh engineering graduate from IIT in ISRO?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

****

(a), (b) & (c)

Recruitment in ISRO/DOS of candidates with BE/B Tech/ME/ M Tech qualification is conducted at 'PAN INDIA' level and students from several institutes across the country participate, including graduates/postgraduates from IITs. Typically applications for Scientist/Engineers, entry level posts is in the ratio of 1:1000 (approximately).

Number of candidates joining ISRO from IITs, IIMs & other higher educational institutions in last five years indicates sufficiently high numbers as expected.

(d) Number of IITians who have left ISRO in last five years are comparable to candidates from other institutions.

(e) The pay package for entry level ISRO engineer is as per Government norms.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 616

TO BE ANSWERED ON WEDNESDAY, DECEMBER 06, 2023

CHANDRAYAAN-3 LANDER

616. SHRI RAVIKUMAR D.:

Will the PRIME MINISTER be pleased to state:

(a) the details collected by Chandrayaan-3 Lander;

(b) the details of the next plan of ISRO; and

(c) the progress made in human space flight programme so far?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) The Chandrayaan-3 lander, after landing on the lunar surface, had deployed the scientific instruments, and the rover was made to roll out. The scientific instruments onboard the lander and rover were operated till the completion of the lunar day. The major findings of the Chandrayaan-3 lander-rover duo include first-ever detection of Sulphur on the lunar regolith, along with trace constituents like Carbon, Nitrogen, Phosphorus, Titanium,

Manganese, Cromium, Nikel; first-ever temperature profiling of the lunar regolith up to ~ 10 cm depth, results show good thermal insulating properties of the lunar soil. In addition to these, the Instrument for Lunar Seismic Activity (ILSA) instrument onboard the lander recorded a few events of ground vibrations of the lunar surface. The Langmuir probe onboard the Chandrayaan-3 lander did the first-ever characterization of the near-surface lunar plasma at higher lunar latitude; the first-cut observations indicate that only a few tens to hundreds of electrons per cubic centimeter exist near the lunar surface.

(b) Building upon the success of Chandrayaan-3, future Chandrayaan missions are undergoing feasibility studies, which shall be put up for Government approval at an appropriate stage. As of now, future Chandrayaan Missions are undergoing the overall mission architecture design phase, wherein studies are being done towards finalizing the system configuration, flight profile, identification of critical technologies, required infrastructure, etc.

(c) The status of Indian human space flight programme 'Gaganyaan' is as follows;

I. Test Vehicle TV-D1 Mission: First test vehicle mission (TV-D1) successfully accomplished on 21st October, 2023.

II. Comprehensive Assessment of Gaganyaan Programme: A Special Committee reviewed and recommended

additional test programmes for ensuring high reliability and confidence to the mission.

III. Human rating of launch vehicle: Testing of all propulsion systems completed.

IV. Crew Management: Crew training and associated evaluation are in progress with the selected astronauts.

V. Infrastructure for Gaganyaan Mission is getting ready to meet the overall schedules.

VI. With the finalised qualification programme prior to human space missions, 3 more Test Vehicle abort missions & 3 unmanned missions to orbit are planned. The overall schedule is to accomplish the Human space mission by end of 2025.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 620

TO BE ANSWERED ON WEDNESDAY, DECEMBER 06, 2023

MANUFACTURING OF ROCKETS

620. SHRI THIRUMAAVALAVAN THOL:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has permitted private enterprises to manufacture or assemble full or partial rockets in India;

(b) if so, the details thereof;

(c) whether the Government has formulated Licencing policy for such private manufacturers;

(d) if so, the details of licence rules thereof, if any; and

(e) if not, the grounds on which such permissions are granted?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) IN-SPACe authorization is mandatory, as per Indian Space Policy 2023, for an Indian Entity (Government or Non-Government

entity) to undertake the launch and operations of launch vehicles, including sub-orbital launches. However, for manufacturing or assembling full or partial rockets in India, any specific authorization from IN-SPACe is not required.

(b) M/s. Skyroot Aerospace Pvt. Ltd. Hyderabad was authorized to take up the Sub-Orbital launch of its rocket Vikram-S from the launch base of ISRO at SDSC-SHAR. The launch was undertaken successfully on November 18, 2022.

(c), (d) & (e)

IN-SPACe has mandate to authorize space activities by Indian entities in accordance with the Indian Space Policy-2023. The guidelines for implementation of the Indian Space Policy-2023 are under formulation. The standard Operating Procedure (SOP) and guidelines for processing the authorization application by IN-SPACe have been formulated.

The applications are scrutinized on the basis of safety, national security, technical, RF Interference, compliance to national & International regulatory guidelines, State's liability towards third party damage from the Indian space object, International Obligations, geopolitical & foreign considerations, export & Import regulations, FDI, etc.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 1667

TO BE ANSWERED ON WEDNESDAY, DECEMBER 13, 2023

PROGRAMME FOR SPACE EDUCATION

1667. SHRI RANJEETSINGH NAIK NIMBALKAR:

SHRI BIDYUT BARAN MAHATO:

SHRI DILIP SAIKIA:

SHRI DEVIJI M. PATEL:

SHRI SUDHAKAR TUKARAM SHRANGARE:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has launched any specific programmes, initiatives and activities to promote space education and outreach among the youth;

(b) if so, the details thereof;

(c) whether the Government has any mechanism to ensure the accessibility of space education and outreach programmes to the vulnerable populations;

(d) if so, the steps taken for the same and if not, the reasons therefor;

(e) whether the Government has coordinated/ collaborated with any of the educational institutions for the aforementioned initiatives to promote space education;

(f) if so, the number and details of such institutions;

(g) if not, whether the Government is planning for such future collaborations; and

(h) if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) Yes Sir.

(b) ISRO has instituted a Space Tutor, YUva VIgyani KAryakram (YUVIKA) & Space on Wheels programme to promote space education and outreach activities among young minds across the country.

(c) Yes Sir.

(d) Announcement of opportunity is released through ISRO portal and all the interested non-profitable organizations and educational institutions are eligible to apply and register as ISRO's registered space tutors. Every year announcement is being made through ISRO portal for eligible school students to apply for YUVIKA

programme. MOU signed with Vijnana Bharati (VIBHA) to move the Space on Wheels in the nook & corner of the country.

(e) Yes Sir.

(f) As of now 96 nos. of non-profitable organization and educational institutions have registered with ISRO on ISRO's registered space tutors. Collaborated with VIBHA for networking the movement of Space on Wheels to local educational institutions across the country.

(g) Does not arise.

(h) Does not arise.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 1673

TO BE ANSWERED ON WEDNESDAY, DECEMBER 13, 2023

MOU IN SPACE

1673. SHRI A. GANESHAMURTHI:

Will the PRIME MINISTER be pleased to state:

(a) whether India and France have recently signed MoU in Digital Technology and Space;

(b) if so, the details thereof; and

(c) the details of areas in which the agreement is going to be focused along with its duration?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a), (b) & (c)

Indian Space Research Organisation (ISRO) and French National Space Agency (CNES) have recently signed the following 3 cooperative documents in the field of space, which were

announced during the visit of Hon'ble Prime Minister of India to France:

1. **Implementing Arrangement concerning cooperation on the joint visible, short wave and thermal infra-red earth observation mission, Thermal infRared Imaging Satellite for High resolution Natural resource Assessment 'TRISHNA'. This document provides terms and conditions under which both space agencies work for realizing the joint satellite and will be valid for the duration of the satellite.**
2. **Agreement for receiving services on conjunction analysis, evaluation and recommendations related to SARAL satellite using JAC (JAVA for Assessment of Conjunction) software. The agreement is valid till December, 2029.**
3. **Arrangement for implementation of short term plan for Maritime Domain Awareness of Indian Ocean with existing satellite constellation. This document will be valid till the implementation of the short term plan.**

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 1645

TO BE ANSWERED ON WEDNESDAY, DECEMBER 13, 2023

COST OF CHANDRAYAAN MISSION

1645. SHRI SUNIL KUMAR SINGH:

SHRI MOHANBHAI KALYANJI KUNDARIYA:

SHRI DIPSINH SHANKARSINH RATHOD:

Will the PRIME MINISTER be pleased to state:

(a) the details of the Future Chandrayaan Missions;

(b) the details of cost incurred/to be incurred on such missions; and

(c) whether any international space organisations have requested India for the transfer of technology and future space cooperation after the successful Chandrayaan Mission?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

****

(a) Building upon the success of Chandryaan-3, future Chandrayaan missions are undergoing feasibility studies, which shall be put up for Government approval at an appropriate stage.

(b) As of now, future Chandrayaan Missions are undergoing the overall mission architecture design phase, wherein studies are being done towards finalizing the overall system configuration, flight profile, identification of critical technologies, required infrastructure, etc. Once these studies are completed, the detailed project report, along with budgetary aspects for the integrated lunar exploration roadmap, shall be prepared.

(c) As of now, after the successful Chandrayaan Mission, no International space organisations has requested India for the transfer of technology. With regards to the future space cooperation, ISRO has robust international collaborations with several spacefaring and non-spacefaring nations, which are showing interest for further collaborations.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 1721

TO BE ANSWERED ON WEDNESDAY, DECEMBER 13, 2023

COMPLETION OF CHANDRAYAAN-3 PROJECT

1721. SHRI SUNIL DATTATRAY TATKARE:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that ISRO has successfully completed the project Chandrayaan-3;

(b) if so, the details thereof;

(c) whether the Government is planning to utilize ISRO as a facilitator for other countries to provide launch facility and other space programmes; and

(d) if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

****

(a) & (b)

Yes Sir. India's third mission to Moon – Chandrayaan-3 was successfully launched at 14:35 hrs on 14th July, 2023 from

Sriharikota on LVM-3 launch vehicle. The Chandrayaan-3 lander successfully accomplished soft landing on 23rd August, 2023 and subsequently the Rover was deployed. All the scientific instruments, onboard the lander and rover, have collected data, which is being studied. All the mission objectives of Chandrayaan-3 mission have been successfully accomplished.

(c) & (d)

Yes Sir. Launch Services to other countries are offered onboard ISRO Launch Vehicles on a commercial basis through the M/s. NewSpace India Limited (NSIL) – the Central Public Sector Enterprise under Department of Space.

Further, ISRO also engages in joint development of satellites with foreign space agencies and launching the same. Recent examples include the India-Bhutan Satellite (launched in 2022) and other upcoming ones viz. the NASA-ISRO Synthetic Aperture Radar (NISAR) satellite and TRISHNA (Thermal InfRared Imaging Satellite for High Resolution Natural Resource Assessment) being developed with CNES.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 1732

TO BE ANSWERED ON WEDNESDAY, DECEMBER 13, 2023

LAUNCH OF ADITYA L1

1732. SHRI BALASHOWRY VALLABHANENI:
SHRI THIRUMAAVALAVAN THOL:

Will the PRIME MINISTER be pleased to state:

(a) whether Aditya-L1 will shape the next phase of India's space forays, if so, the details thereof;

(b) the extent to which Aditya-L1 is going to be able to study Solar's corona, solar activity and space weather;

(c) the extent to which Indian Institutes of Astrophysics is playing its role in achieving the objectives of Aditya-L1;

(d) whether Aditya-L1 has been successfully launched, if so, the details thereof;

(e) whether Aditya-L1 is in its planned trajectory and

(f) if so, the time by which Aditya-L1 is expected to reach the Langrange Point 1?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) & (b)

Yes Sir. Aditya L1 is set to become India's first space-based mission dedicated to studying the Sun. The spacecraft will be positioned in a halo orbit encircling Lagrange point 1 (L1) within the Sun-Earth system, situated approximately 1.5 million kilo meter away from Earth. This will provide an uninterrupted view of the Sun, and hence, will enhance our ability to monitor solar activities.

The spacecraft is equipped with seven (07) payloads designed to observe various layers of the Sun, including the photosphere, chromosphere, and the outermost layer, the corona. These observations are made possible through a combination of electro-magnetic particle, and magnetic field detectors. Positioned at the advantageous L1 point, four of the payloads directly observe the Sun, while the remaining three conduct in-situ studies of particles and fields at Lagrange point L1.

The Aditya L1 payloads are anticipated to yield vital insights into key solar phenomena, such as coronal heating, coronal mass ejections, pre-flare and flare activities, as well as the characteristics and dynamics of space weather. Additionally, the studies will contribute to a deeper understanding of the propagation of particles and fields in space.

(c) The Indian Institute of Astrophysics (IIA), Bangalore, has developed, with the support of the ISRO centres, the Visible Emission Line Coronagraph (VELC) payload for the Aditya-L1 mission, which is meant to study the solar corona, by imaging and spectroscopic techniques.

(d) Yes Sir. The Aditya-L1 spacecraft has been successfully launched on September 2, 2023, onboard PSLV-C57. The vehicle has placed the satellite precisely into its intended orbit.

(e) Yes Sir. Aditya-L1 is in its planned trajectory.

(f) Aditya-L1 is expected to reach the Sun-Earth L1 point in the first half of January, 2024.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 1754

TO BE ANSWERED ON WEDNESDAY, DECEMBER 13, 2023

INDIAN SPACE TECH STARTUPS

1754. SHRI S. JAGATHRAKSHAKAN:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government is aware that several Indian space tech startups have plans for developing satellite constellations for purposes ranging from hyperspectral imagery to improving extra-terrestrial surveillance for the Indian armed forces and identification of space debris to ensure a safe passage for space missions in the Lower Earth Orbit (LEO); and

(b) if so, the details of the initiatives that are proposed to be taken by the Government in this regard?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) Subsequent to the reforms in the space sector and Indian Space Policy – 2023, Indian private space sector is encouraged to carry on end-to-end space activities, such as building and

launching satelltes, satellite control stations, providing communication services, earth observation applications, identification of space debris independently.

(b) The following major initiatives have been taken by the government to increase the share of the private sector in the Indian space economy and encourage them to carry out end-to-end space activities:

i. The space sector has been liberalized and private sector allowed to carry out end to end space activities.

ii. Indian National Space Promotion and Authorization Centre (IN-SPACe) was created in Department of Space for promoting, authorizing and overseeing the activities of non-government entities (NGEs) in Space Sector.

iii. India Space policy 2023 has been released, where roles and responsibilities of all the stakeholders contributing to the overall Indian Space Ecosystems are defined.

iv. Various schemes to encourage and hand hold private sector also announced and implemented by IN-SPACe, i.e., Seed fund Scheme, Pricing Support Policy, Mentorship support, Design Lab for NGEs, Skill Development in Space Sector, etc.

****

O.I.H.

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 1700

TO BE ANSWERED ON WEDNESDAY, DECEMBER 13, 2023

PRIVATE COMPANIES IN INDIAN SPACE SECTOR

1700. DR. SANGHMITRA MAURYA:

Will the PRIME MINISTER be pleased to state:

(a) whether there is dawn of a new era in the Indian Space Sector after opening window of opportunity to the Private Sector Companies; and

(b) if so, the manner in which the said step is likely to work as a force factor in this regard?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) & (b)

Yes Sir. The government has announced the Indian Space Policy 2023, which enables end to end participation of NGEs in all domain of space activities. Due to incentives and reform in the space sector, following are the developments and impact:

- **The investment in Indian Space Start-Ups has increased to $ 124.7 Million in 2023 Year to Date (YTD).**
- **Some NGEs launched their own satellites. Many other Space Industries and Start-Ups are also building their own Satellites & constellations. These satellites shall contribute to applications in agriculture, disaster management, environmental monitoring, etc.**
- **One NGE launched their sub-orbital launch vehicle.**
- **A private launchpad and mission control center established within the ISRO campus for the first time by an NGE. Sub-orbital launch by that NGE is scheduled shortly.**
- **Satellite integration and testing facilities are coming up in private sector.**
- **The local manufacturing of the satellite subsystems and Ground systems are being taken up by private sector.**
- **Indian private space companies are increasingly entering into collaborations and partnerships with international space organizations and companies.**

It is expected that private sector will independently take up end to end solution in satellite manufacturing, launch vehicle manufacturing, provide satellite services, and manufacture ground systems.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 1738

TO BE ANSWERED ON WEDNESDAY, DECEMBER 13, 2023

LAUNCH OF SATELLITES

1738. SHRI KANUMURU RAGHU RAMA KRISHNA RAJU:

Will the PRIME MINISTER be pleased to state:

(a) whether about 50,000 satellites are likely to be launched in the next ten years and India could pick up a big chunk of this market if so, the details thereof;

(b) whether ISRO is famously frugal but the private sector usually finds ways to reduce costs, and the entry of private players has reduced satellite launch costs by close to 90 percent on a per kilogram basis;

(c) if so, whether several consortiums of Indian firms are looking to enter the satellite launching market and the transfer of technologies will mean they will be capable of building rockets end-to-end as well as establish their own launch facilities;

(d) if so, the details and the present status thereof; and

(e) the steps being taken by the Government to find a balance in terms of allowing private sector exploitation of space via light-touch

regulation while trying to ensure the avoidance of environmental and other hazards in the future?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) Although there has been an increasing trend of the number of satellites launched over the previous decade, there is no credible data available that confirms that 50,000 satellites could be launched in next 10 years.

(b) Efforts are ongoing to reduce the launch costs across ISRO as well as private sector. However, estimating the exact percentage reduction in satellite launch costs is not feasible.

(c) & (d)

Yes, Sir. With the advent of reforms in the space sector and subsequent release of Indian Space Policy, Non-Government Entities (NGEs) are being encouraged to take up development of their own space transportation system and establish their own launch facilities. Major developments in this regard are as follows:

- M/s. Skyroot Aerospace Pvt. Ltd. launched their sub-orbital launch vehicle 'Vikram-S', on 18th November, 2022.

- **A private launch pad and a mission control center has been established within the ISRO campus for the first time by M/s. Agnikul cosmos Pvt. Ltd.**
- **NewSpace India Limited [NSIL] is also working towards realization of operational launch vehicles of ISRO through Indian Industries**

(e) **The Indian Space Policy 2023 already provides a comprehensive regulatory framework for providing a level playing field for Non-Government Entities (NGEs) in the space sector, via authorization through IN-SPACe.**

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 2822

TO BE ANSWERED ON WEDNESDAY, DECEMBER 20, 2023

PROMOTING SPACE EDUCATION AND RESEARCH

2822. SHRI DIPSINH SHANKARSINH RATHOD:
SHRI MOHANBHAI KALYANJI KUNDARIYA:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government is taking steps to promote space education and research within the country, fostering a skilled workforce and ensuring a sustainable future for India's space programme;

(b) if so, the details thereof and if not, the reasons therefor; and

(c) the ways in which ISRO has contributed to global efforts in addressing environmental challenges, climate change and sustainable development through satellite-based observations and data sharing?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) & (b)

Yes, Sir. Several steps are being taken by the Government in this regard, including:

- **Sponsored Research programme (RESPOND) for promoting Space research in academia.**
- **Establishment of Space Technology Cells (STCs), Regional Academic Centres for Space (RAC-S), Space Technology Incubation Centres (STICs) at various technical institutes across the country.**
- ***Yuva Vijyani Karyakram* Young Scientists Programme (YUVIKA): For young high school students involving two weeks training, hands on skills, interaction with eminent scientists and facility visit.**
- **Space Tutor Programme: Enabling NGOs & Institutions in promoting Space Education & outreach across the country.**
- ***Antariskh Jigyasa Portal:* for educating students online in space Science and Technology.**
- **Outreach through Space Exhibitions/ Conferences/ Museums and Space on Wheels, with Six such units covering areas across country.**
- **Indian Space Science & Technology (IIST) and Indian Institute of Remote Sensing (IIRS), which offer short and long term courses.**

(c) ISRO is contributing in global efforts towards addressing environmental challenges, climate change and sustainable development, through:

- Jointly building earth observation satellites with other space agencies and/or accommodating payloads of other countries in its own satellites;
- Realizing the EO satellite for other nations;
- Satellite data exchange and data sharing;
- Satellite derived services for other nations; and
- Capacity building for realization of satellites and satellite-based earth observations applications.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 2913

TO BE ANSWERED ON WEDNESDAY, DECEMBER 20, 2023

LAUNCH OF SATELLITES

2913. DR. SANJAY JAISWAL:

DR. SATYAPAL SINGH:

DR. ARVIND KUMAR SHARMA:

Will the PRIME MINISTER be pleased to state:

(a) the details of total number of foreign and domestic satellites launched by India in the last decade;

(b) the manner in which these number compare with the previous decade; and

(c) the details of the money spent and revenue generated along with the projected growth in this sector?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

****

(a) The number of foreign and domestic satellites launched by India during period 2014-23 were 396 and 70 respectively.

(b) The number of foreign and domestic satellites launched by India during period 2003-13 were 33 and 31 respectively.

(c) The revenue generated from satellite launches during decade 2014-23 is USD157 Million and 260 Million Euros. The corresponding figure during decade 2003-13 were USD15 Million and 32 Million Euros.

Annual Budget allocated to Department of Space has grown from Rs. 6792 Crores for FY 2013-14 to Rs. 12544 Crores for FY 2023-24.

As per various global estimates and news outlets, the sector is projected to grow at 6-8 % in coming years

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 2946

TO BE ANSWERED ON WEDNESDAY, DECEMBER 20, 2023

FDI IN SPACE SECTOR

2946. SHRIMATI SUNITA DUGGAL:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has taken any steps to promote Foreign Direct Investment (FDI) in Space sector and if so, the details thereof;

(b) whether IN-SPACe has taken any policy measures to encourage start ups and private sector participation in the space sector;

(c) if so, the details thereof; and

(d) the measures taken by the Indian Space Association (ISpA) since inception for enhancing space industry in the country?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

****

(a) Presently, FDI is space sector is allowed under Government route for satellite establishment and operations. In order to promote Foreign Direct Investment (FDI) in Space Sector, the Department

of Space in consultation with DPIIT is in the process of reviewing the FDI policy guidelines of space sector.

(b) & (c)

Yes Sir. The following major initiative has been taken by IN-SPACe to encourage the startups and private sector participation in the space sector:

1. Indian Space Policy 2023 has been released by GoI, where roles and responsibilities of all the stakeholders contributing to the overall Indian space ecosystems defined.
2. Various schemes to encourage and hand hold private sector also announced and implemented by IN-SPACe, i.e., Seed Fund Scheme, Pricing Support Policy, Mentorship support, Design Lab for NGEs, Skill Development in Space Sector, ISRO facility utilization support, Technology Transfer to NGEs.
3. IN-SPACe has signed around 45 MoUs with Non-Government Entities (NGEs) to provide necessary support for realization of space systems and applications envisaged by such NGEs, which is expected to increase the industry participation in manufacturing of launch vehicles and satellites.

(d) There are several industry associations in the country related to space sector, ISpA being one among them. The activities being carried out by such industry associations does not come under the purview of government.

****

O.I.H.

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 2960

TO BE ANSWERED ON WEDNESDAY, DECEMBER 20, 2023

CENTRES OF ISRO

2960. SHRI NIHAL CHAND:

Will the PRIME MINISTER be pleased to state:

(a) the number of centres of Indian Space Research Organisation (ISRO) in the country at present State and Union Territory-wise;

(b) the position of India in comparison to other countries in the fields of space research;

(c) whether the Government proposes to establish new space research centres in other parts of the country;

(d) if so, the details thereof; and

(e) the progress made in the field of Indian Space Research during the last five years?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

****

(a) Indian Space Research Organization has its Centers/Units spread throughout the country with following distribution:

Centres/Units/Liaison Office	State	Number
Regional Remote Sensing Centre [RRSC] (West)	Rajasthan	3
Solar Observatory		
Infrared Observatory		
Space Applications Centre	Gujarat	2
Physical Research Laboratory		
Delhi Earth station	Delhi	2
RRSC [North]		
Indian Institute of Remote Sensing	Uttarakhand	1
ISTRAC Ground Station	Uttar Pradesh	1
RRSC [East]	West Bengal	1
North Eastern Space Applications Centre (NESAC)	Meghalaya	1
RRSC [Central]	Maharashtra	1
Master Control Facility (Bhopal)	Madhya Pradesh	1
National Remote Sensing Centre [NRSC]	Telangana	1
Satish Dhawan Space Centre [SDSC]	Andhra Pradesh	2
National Atmospheric Research laboratory [NARL]		
U R Rao satellite Centre [URSC]	Karnataka	6

Centres/Units/Liaison Office	State	Number
Human Space Flight Centre [HSFC]		
Laboratory for Electro optic systems [LEOS]		
ISRO Telemetry , Tracking and command network [ISTRAC]		
RRSC (South)		
Master Control Facility [MCF]		
Vikram Sarabhai Space Centre [VSSC]	Kerala	4
Liquid Propulsion Systems Centre [LPSC]		
ISRO Inertial Systems Unit [IISU]		
Indian Institute of Space Science and Technology [IIST]		
ISRO Propulsion Complex [IPRC]	Tamil Nadu	1
Down range Station	Andaman & Nicobar Islands	1

(b) India is the fifth amongst spacefaring nations having end-to-end capabilities in space research and development, including the capability to launch from our own land and operate programs of earth observation, satellite communication, meteorology, space science & navigation and ground infrastructure. Now, NewSpace

industries are also emerging at fast pace after space sector reforms.

(c) & (d)

The existing centres of ISRO in various parts of country are making sufficient contributions towards R&D in space sector. To support NGEs for small satellite launches a new launch complex at Thoothukudi is proposed.

(e) During the last five years, significant progress has been made in the Indian Space Research sector. Some of the major achievements are listed below:

- India's second mission to Moon, Chandrayaan-2 was successfully launched on July 22, 2019 on-board GSLV Mk III-M1. Chandrayaan-2 Orbiter is providing valuable science data for the research community.
- The launch of PSLV-C48/ RISAT-2BR1 in December, 2019 marked the 50th launch of PSLV, the workhorse launch vehicle.
- On June 26, 2020, the Government of India announced Space Sector Reforms – a major transformation of Indian Space Sector with enhanced participation of private players in Indian space programme and playing key roles to boost India's market share in Global Space Economy.
- Setting up of Indian National Space Promotion and Authorisation Centre (IN-SPACe) and enhancing the role of New Space India Limited (NSIL) are the two major thrust areas in the Reforms. IN-SPACe Headquarters at Ahmedabad was inaugurated by the Hon'ble Prime Minister in June, 2022.

- LVM3 (GSLV MkIII) M2/OneWeb India-1 Mission was successfully accomplished on 23rd October 2022.
- Launch of Vikram-S (Prarambh mission), a suborbital launch vehicle from M/s. Skyroot Aerospace Pvt. Ltd., Hyderabad, was accomplished successfully on 18th November 2022.
- First private launchpad & mission control center established by M/s. Agnikul Cosmos Pvt. Ltd., Chennai in ISRO campus at SDSC, SHAR on 25th November 2022.
- On February 10th, 2023, the successful flight of Small Satellite Launch Vehicle (SSLV – D2) took place, launching three satellites – EOS-07, Janus-1 and AzaadiSAT-2.
- On March 7th, 2023, controlled re-entry experiment for the decommissioned Megha-Tropiques-1 (MT-1) satellite was carried out successfully, with final impact in the Pacific Ocean, demonstrating the nation's continued efforts towards ensuring the long-term sustainability of outer space activities.
- LVM3 M3/OneWeb India-2 Mission was successfully accomplished on 26th March, 2023, placing 36 OneWeb satellites into their intended orbit. With this, NSIL successfully executed its contract to launch 72 satellites of OneWeb to Low Earth Orbit.
- Reusable Launch Vehicle Autonomous Landing Mission (RLV LEX) was successfully demonstrated at the Aeronautical Test Range (ATR), Chitradurga, Karnataka on 2nd April, 2023.
- GSLV-F12/NVS-01 mission was successfully accomplished on 29th May, 2023. GSLV deployed the NVS-01 navigation satellite, the first of the second-generation satellites

envisaged for the Navigation with Indian Constellation (NavIC) service, into a Geosynchronous Transfer Orbit.

- LVM3-M4 successfully launched the Chandrayaan-3 Spacecraft on 14th July, 2023.
- On 23rd August, 2023, Chandrayaan-3 lander, *Vikram*, successfully soft-landed on the Moon. Subsequently, the rover, *Pragyan*, ramped down on the lunar surface. Over the next few days, several experiments, such as measurement of near-surface plasma content, presence of mineral elements, temperature profile of the lunar topsoil, etc. were conducted by the on-board payloads.
- On September 02, 2023, Aditya-L1 spacecraft – India's first solar observatory – was launched on board PSLV C57. The spacecraft underwent a series of manoeuvers and is currently on its way to the Sun-Earth Lagrange Point 1(L1).
- The first developmental flight of Test Vehicle (TV-D1) was successfully accomplished with the in-flight abort demonstration of the Crew Escape System (CES) on October 21, 2023 from FLP, SDSC, Sriharikota. TV-D1 Crew Module was safely recovered from sea with the help of Indian Navy and transported back to ISITE, Bengaluru.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 2978

TO BE ANSWERED ON WEDNESDAY, DECEMBER 20, 2023

PRIVATE PLAYERS IN SPACE

2978. SHRIMATI KESHARI DEVI PATEL:
SHRI SATYADEV PACHAURI:
SHRI DUSHYANT SINGH:
SHRIMATI RANJANBEN DHANANJAY BHATT:
DR. ARVIND KUMAR SHARMA:

Will the PRIME MINISTER be pleased to state:

(a) whether opening the space to private players has heralded a new era in Indian space sector, if so, the details thereof;

(b) whether the Government has taken any initiative for greater participation of private industries in the space sector;

(c) if so, the details thereof along with the number of registered startups in this sector;

(d) the efforts that are being taken by the Government in reaching out to the academic community as well as young startups through hand-holding, ecosystem support and funding in the country's backward areas; and

(e) the details of the contribution of space sector to the economy in the last five years and the projected contribution in the coming years?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a), (b) and (c)

Yes sir, the government has announced the Indian Space Policy 2023, which enables end to end participation of NGEs in all domain of space activities. Due to incentives and reform in the space sector, following are the developments and impact:

- The number of Space Start-Ups have gone up, from just 1 in 2014 to 189 in 2023 as per DPIIT Start-Up India Portal.
- The investment in Indian Space Start-Ups has increased to $ 124.7 Million in 2023.
- Some NGEs launched their own satellites. Many other Space Industries and Start-Ups are also building their own Satellites & constellations. These satellites shall contribute to applications in agriculture, disaster management, environmental monitoring, etc.
- One NGE launched their sub-orbital launch vehicle.

- A private launchpad and mission control centre established within the ISRO campus for the first time by an NGE. Sub-orbital launch by that NGE is scheduled shortly.
- Private companies are exploring satellite-based communication solutions. Private players are increasingly participating in space-based applications and services.
- Satellite integration and testing facilities are coming up in private sector.
- The local manufacturing of the satellite subsystems and Ground systems are being taken up by private sector.
- Indian private space companies are increasingly entering into collaborations and partnerships with international space organizations and companies.

(d) Efforts that are being taken in reaching out to the academic community as well as young startups through handholding, ecosystem support and funding in the country's backward areas are as follow:

1. A national committee for adoption of space technology education in India is formed by IN-SPACe, with an aim to facilitate and promote the integration of space technology education across academic institutions in India, fostering awareness, skill development and research.
2. List of retired ISRO subject experts is published on IN-SPACe Digital Platform (IDP). NGEs can approach these mentors directly for expert advice etc.

3. Periodically invite willingness from the technocrats having experience in space sector as mentors and connect them to NGEs.
4. To encourage Students/Academic Institutions to carry out space activities, a committee has been constituted which will evaluate their proposal and provide necessary guidance.
5. In order to develop quality manpower in the space sector, IN-SPACe is periodically organising skill development short term courses in association with ISRO along with Seed Fund Scheme.

(e) The current size of the Indian Space Economy is estimated around $8.4 billion (around 2-3% of global space economy) and it is expected that with the implementation of the strategy $ 44 billion Indian space economy can be achieved by the year 2033. The role of the private sector will be prime to achieve the expected economy figure. It is expected that private sector will take up independently end to end solution in satellite manufacturing, launch vehicle manufacturing, provide satellite services, and manufacture ground systems.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 579

TO BE ANSWERED ON THURSDAY, DECEMBER 07, 2023

PLAN TO INCENTIVISE PRIVATE SECTOR

579. SHRI M. MOHAMED ABDULLA:

Will the PRIME MINISTER be pleased to state:

(a) whether Government has any plans to incentivise the private sector in the space research industry in areas such as reusable launch vehicles, human rated space craft etc., such that the private sector becomes a critical stakeholder in the space economy;

(b) if so, the details thereof; and

(c) whether Government believes that the country will take a quantum jump into the Second Space Age through this?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) & (b)

Yes, Sir. The Government considers the private sector as a critical stakeholder in the space economy which is reflected in the Indian Space Policy-2023 that encourages private sector for end-to-end participation in the entire value chain of the space economy, including the research oriented areas such as reusable launch vehicles and human rated spacecraft as well.

In this regard, the Government has already set up Indian National Space Promotion and Authorization Centre [IN-SPACe] which is responsible for promoting, handholding and authorizing space activities. IN-SPACe has been working on various incentives to promote private sector participation. Further, liberalization in FDI regulations pertaining to space sector is also being worked out, that is expected to bring in foreign capital and global private players in India.

(c) With the increased participation of private sector in space activities, a widening of the national space technology ecosystem is envisaged along with permeation of knowledge from ISRO to private sector. With these steps, the country's share in global space economy is expected to increase.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 620

TO BE ANSWERED ON THURSDAY, NOVEMBER 07, 2023

ACHIEVEMENTS OF ISRO

620. SHRI SUJEET KUMAR:

Will the PRIME MINISTER be pleased to state:

(a) the details of the programmes undertaken by ISRO in the years 2020-2023;

(b) whether Government proposes to increase the budgetary allocation for the Department of Space to enhance research and innovation in the sector; and

(c) if so, the details thereof and if not, the reasons therefor?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

****

(a) The details of the programmes undertaken by ISRO since 2020 till date are as follows:

Satellites	**Launch Vehicle**	**Status**
GSAT-30	Procured Launch	Launched on January 17, 2020
EOS-01	PSLV-C49	Launched on November 07, 2020
CMS-01	PSLV-C50	Launched on December 17, 2020
Commercial-NSIL	PSLV-C51	Launched on February 28, 2021
EOS-03*	GSLV-F10	Launched on August 12, 2021
EOS-04	PSLV-C52	Launched on February 14,

Satellites	Launch Vehicle	Status
		2022
GSAT-24 (NSIL)	Commercial Launcher	Launched on June 30, 2022
Commercial-NSIL	PSLV-C53	Launched on June 30, 2022
EOS-02*	SSLV-D1*	Launched on August 7, 2022
Commercial-NSIL	LVM3-M2	Launched on October 23, 2022
EOS-06	PSLV-C54	Launched on November 26, 2022
INS-2B	PSLV-C54	Launched on November 26, 2022
EOS-07	SSLV-D2	Launched on February 10, 2023
Commercial-NSIL	LVM3-M3	Launched on March 26, 2023
	RLV-LEX**	Launched on April 02, 2023
Commercial-NSIL	PSLV-C55	Launched on April 22, 2023
NVS-01	GSLV-F12	Launched on May 29, 2023
Chandrayaan-3	LVM3-M4	Launched on July 14, 2023
Commercial-NSIL	PSLV-C56	Launched on July 30, 2023
Aditya L1	PSLV-C57	Launched on September 02, 2023
	TV-D1**	Launched on October 18, 2023
*Mission Unsuccessful **Technology Demonstrator		

(b) & (c)

Government has allocated funds of Rs. 12,543.91 Cr. during the year 2023-24 for the Department of Space which is about 19% increase compared to the RE 2022-23 allocations i.e., Rs. 10,530.00 Cr.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 621

TO BE ANSWERED ON THURSDAY, NOVEMBER 07, 2023

SPACE PROGRAMMES AND MISSIONS IN 2024

621. DR. K. LAXMAN:

Will the PRIME MINISTER be pleased to state:

(a) the details of country's space programmes and missions to be launched in the year 2024;

(b) the details of the number of Indian Space startups and companies which are working for the development of the space sector;

(c) whether any incentives are being provided by Government to help them; and

(d) if so, the details thereof and impact of the same?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) In 2024, the following space missions are planned by the Department:

1) Six PSLV missions including two missions to launch a space science satellite and an Earth observation satellite, two technology demonstration missions and two commercial missions by NewSpace India Limited (NSIL).
2) Three GSLV missions to launch a meteorology satellite, a Navigation satellite and a joint NASA-ISRO Synthetic Aperture Radar satellite.
3) One LVM3 commercial mission by NewSpace India Limited (NSIL).
4) Two unmanned missions under the Gaganyaan programme to validate the human rated launch vehicle and the orbital module in actual flight. In addition, multiple sub-orbital missions using a Test Vehicle (TV) are also planned to validate the Gaganyaan Crew Escape System under various abort conditions.

5) One mission of SSLV, which is the third developmental flight that will also launch a technology demonstration satellite.
6) Two autonomous runway landing experiments of winged body Reusable Launch Vehicle (RLV).
7) GSAT 20 communication satellite mission by NewSpace India Limited (NSIL) through a procured launch under a commercial contract

(b) The total number of startups and companies who have provided their capabilities on IN-SPACe digital platform for space sector as on November, 2023 is 523. Out of which 297 have submitted application to IN-SPACe seeking support from ISRO for R &D and testing.

(c) & (d)

With the unlocking of the space sector for the private sector by the Government, following support activities are provided to the private sector: -

1. Providing mentorship as well as ISRO facility utilization support.
2. Technology Transfer to NGEs.
3. IN-SPACe Seed fund support to startups to transform novel idea into a prototype development.
4. IN-SPACe Price support for NGEs for utilization of ISRO's facility.
5. Creation of IN-SPACe digital platform to connect all the stack holders of space eco system.
6. Established IN-SPACe Design Lab, where startups can use high end simulation software for design and analysis of critical space systems/subsystems.
7. Skill development in for emerging space technology area
8. Proposed Investment Incentive Scheme in Space Sector/Sub-sector

Impact of the incentives provided are as follows:

- The number of Space startups have gone up to 200+ in 2023.
- The investment in Indian Space Startups has increased to $ 124.7 Million.
- The sub-orbital launch of Rocket Vikram -S was undertaken successfully by M/s. Skyroot Aerospace Private Ltd., Hyderabad.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 622

TO BE ANSWERED ON THURSDAY, NOVEMBER 07, 2023

COUNTRY'S SPACE ECONOMY

622. SHRI KARTIKEYA SHARMA:

Will the PRIME MINISTER be pleased to state:

(a) the current size of the country's space economy and the share split between Government and private entities;

(b) the growth in the country's space economy over the last five years;

(c) whether Government proposes to increase the share of the private sector in the country's space economy, if so, the steps taken so far;

(d) the projected size of the country's space economy in the years to come and the role of the private sector in it; and

(e) the steps taken by Government to promote private investment in the space sector?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) The current size of the Indian Space Economy is estimated around 8.4 Billion USD. Of this, the downstream services market, primarily comprising of communication and data applications, accounts for close to 80% of the total space economy, wherein the private sector is a major contributor. The upstream market i.e. satellite and launch operations, is primarily contributed by Government, with private sector in a vendor-oriented role towards manufacturing and delivering subsystems/components.

(b) As per the various market surveys, the space economy has grown with an average CAGR of 8%.

(c) Yes, Sir. The following major initiatives have been taken by the government to increase the share of the private sector in the Indian space economy:

1) The space sector has been liberalised and private sector allowed to carry out end to end space activities.

2) Indian National Space Promotion and Authorization Centre (IN-SPACe) was created in Department of Space for promoting, authorising and overseeing the activities of non-government entities (NGEs) in Space Sector.

3) India Space policy 2023 has been released, where roles and responsibilities of all the stakeholders contributing to the overall Indian Space Ecosystems defined.

4) Various schemes to encourage and hand hold private sector also announced and implemented by IN-SPACe, i.e., Seed fund Scheme, Pricing Support Policy, Mentorship support, Design Lab for NGEs, Skill Development in Space Sector, etc.

(d) The aspirational targeted size of Indian space economy is about 44 Billion USD by the year 2033. The role of the private sector will be prime to achieve the expected figure. It is expected that private sector will take up independently end to end solution in satellite manufacturing, launch vehicle manufacturing, provide satellite services, and manufacture ground systems.

(e) In addition to the initiatives taken at (c) above, the investment in Space Start-Ups has increased from 6 Mn USD in 2019 to over 125 Mn USD in 2023 ($370 Mn Cumulative). The revised FDI policy is at its final phase of approval, which will enable investment in all the sectors of space economy.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 623

TO BE ANSWERED ON THURSDAY, NOVEMBER 07, 2023

CHANDRAYAAN MISSIONS

623. SHRI AJAY PRATAP SINGH:

Will the PRIME MINISTER be pleased to state:

(a) the details of the future Chandrayaan Missions;

(b) the details of cost incurred on such missions; and

(c) whether any International space organisation has requested India for the transfer of technology and future space cooperation after the successful Chandrayaan Mission?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

****

(a) Building upon the success of Chandrayaan-3, future Chandrayaan missions are undergoing feasibility studies, which shall be put up for Government approval at an appropriate stage.

(b) As of now, future Chandrayaan Missions are undergoing the overall mission architecture design phase, wherein studies are being done towards finalizing the system configuration, flight profile, identification of critical technologies, required infrastructure, etc. Once these studies are completed, the detailed project report, along with budgetary aspects shall be prepared.

(c) As of now, after the successful Chandrayaan Mission, no International space organisations have requested India for the transfer of technology. ISRO has robust international collaborations with several spacefaring and non-spacefaring nations and undertakes cooperative activities based on the interest, need and mutual benefit.

****

O.I.H.

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 624

TO BE ANSWERED ON THURSDAY, NOVEMBER 07, 2023

PROMOTING INDIGENOUSLY MANUFACTURED EQUIPMENT AND TECHNOLOGIES IN SPACE MISSIONS

624. SHRI ADITYA PRASAD:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that use of domestic and indigenously manufactured equipments and technologies has increased in India's space mission;

(b) if so, the details thereof;

(c) if not, the reasons therefor;

(d) whether Government is promoting the use of indigenously manufactured equipments for upcoming space missions through a number of schemes;

(e) if so, the details thereof; and

(f) if not, the reasons therefor?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

****

(a), (b) & (c)

Yes, Sir. Indian Space Sector has witnessed a consistent increase in the usage of domestic and indigenously manufactured equipment and technologies. Notably, over 90% of

components and sub-systems in launch vehicles are indigenised. More than 500 industries have been contributing to the ISRO supply chain.

(d), (e) & (f)

Yes, Sir. Government has been promoting the use of indigenously manufactured equipment across all sectors through various schemes under the Make in India initiative. In this regard, the Department of Space also complies with the Make in India procurement guidelines which are aimed at boosting indigenous manufacturing, for its upcoming space missions.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 1404

TO BE ANSWERED ON THURSDAY, DECEMBER 14, 2023

USE OF AI AND MACHINE LEARNING IN THE FIELD OF SPACE

1404. SMT. SANGEETA YADAV:

Will the PRIME MINISTER be pleased to state:

(a) the status of use of Artificial Intelligence (AI) and machine learning research in the field of space preparedness in India during the last three years;

(b) the details of the projects and programmes undertaken by the Department in collaboration with industry partners and startups in the domains of AI;

(c) the funds allocated and utilised by Department of Space (DoS) for AI during the last five years;

(d) the achievements and outcomes of AI in terms of enhancing space exploration; and

(e) the steps taken to accelerate the pace of AI for making India a developed nation by 2047?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) Over the last three years, ISRO has been steadily leveraging artificial intelligence and machine learning in space domain, adapting with fast-paced technological developments in these areas. Artificial intelligence and machine learning solutions are being developed for

launch vehicles, spacecraft operations, big data analytics, space robotics, space traffic management, among others.

(b) The projects and programmes in the domains of artificial intelligence being undertaken by Department are at different stages of feasibility studies and implementation. Major ones include –

i. Launch vehicle and spacecrafts mission trajectory design and autonomous operations;

ii. Launch vehicle and satellites health monitoring and prediction from the telemetry data;

iii. Satellite Data Processing for Resource mapping, weather prediction, disaster prediction, geo-intelligence (object and change detection), Precision agriculture, Agroforestry etc.

iv. Humanoid robots and chatbots

v. Space Robotics and smart manufacturing in space.

Collaborative efforts between ISRO and Institutions like IITs, IISc are involved in development of a few niche AI applications.

(c) The development and implementation of Artificial Intelligence solutions are being incorporated in various ongoing projects & programmes of ISRO, based on technical feasibility and mission objectives. The costing of these AI solutions is subsumed within the overall funds allocated to the respective projects/programmes.

Major ones include the Gaganyaan Program, recently accomplished Chandrayaan -3 mission, Operational Launch vehicle and Spacecraft programmes, Earth Observation data analysis, etc.

(d) The major achievements and outcomes of artificial intelligence in terms of enhancing space exploration include –

i. Satellite data analysis and processing of India's remote sensing, meteorological, communication, navigation satellites

ii. Delivery of Earth Observation applications – Crop Yield prediction, Weather Forecasting and Nowcasting, Disaster forecasting, Land Use Land Cover Maps, Urban expansion planning, Detection of encroachment, built-up, settlement, urban waterbodies, forest cover changes, roads, dams, ships, vessels etc.

iii. Interplanetary missions – Chandrayaan and Mars missions, including orbit manoeuvring and soft landing of Chandrayaan-3 including identification of the landing site.

(e) Department of Space is taking several steps to adopt artificial intelligence solutions at a faster pace in space domain, across ISRO Centres and encouraging the private sector as well. Cross- centre endeavours are being undertaken to enable technical exchange on advances in AI technology and its applications in space domain. Some of the initiatives being discussed in the long term include the feasibility of setting-up of dedicated labs for AI, upskilling employees in the AI technologies through the Skill Development Programme at respective centres and organization of various national level AI events/workshops/conferences/seminar.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 1405

TO BE ANSWERED ON THURSDAY, DECEMBER 14, 2023

SPACE TECHNOLOGY INCUBATIONAL CENTRES

1405. DR. ANIL SUKHDEORAO BONDE:
MS. INDU BALA GOSWAMI:

Will the PRIME MINISTER be pleased to state:

(a) the details about the concept of the Space Technology Incubational Centres (STIC); and

(b) the details of the number of Space Technology Cells (STC), Space Technology Incubational Centres (STIC), and Regional Academic Centre for Space (RACS)?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) Space Technology Incubation Centre (S-TIC) has been set-up to attract and nurture the young academia with innovative ideas/ research aptitude for carrying out research, motivating and encouraging them to initiate the start-ups and business in the field of space technology & applications and developing the Academia–Industry ecosystem for Space Technology.

(b) ISRO has set up Space Technology Cells (STC) at following premiere institutions:

Sl. No.	Institute
1.	Indian Institute of Technology (IITs) – Bombay, Kanpur, Kharagpur, Madras, Roorkee, Guwahati and Delhi
2.	Indian Institute of Science (IISc), Bangalore
3.	Joint Research Programme (JRP) with Savitribai Phule Pune University (SPPU)

The details of the six Space Technology Incubation Centres (STIC) are as below:

Sl. No.	Region	Institute
1.	North East	National Institute of Technology, Agartala, Tripura
2.	Northern	Dr. B R Ambedkar National Institute of Technology, Jalandhar, Punjab
3.	Southern	National Institute of Technology, Tiruchirapalli, Tamilnadu
4.	Western	Visvesvaraya National Institute of Technology, Nagpur, Maharashtra
5.	Eastern	National Institute of Technology, Rourkela, Odisha
6.	Central	Maulana Azad National Institute of Technology, Bhopal, Madhya Pradesh

The details of the Regional Academic Centre for Space (RACS) are as below:

Sl. No.	Institute
1.	National Institute of Technology, Kurukshetra, Haryana
2.	Malviya National Institute of Technology (MNIT), Jaipur, Rajasthan
3.	National Institute of Technolgy, Patna, Bihar
4.	Indian Institute of Technology, BHU, Varanasi, Uttar Pradesh
5.	Guwahati University, Guwahati, Assam
6.	National Institute of Technology, Suratkal, Mangalore, Karnataka

****

O.I.H.

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 1407

TO BE ANSWERED ON THURSDAY, DECEMBER 14, 2023

LAUNCHING OF FOREIGN SATELLITES

1407. MS. INDU BALA GOSWAMI:
SHRI MASTHAN RAO BEEDA:

Will the PRIME MINISTER be pleased to state:

(a) the number of foreign satellites launched by ISRO in the last 10 years, the details thereof, year-wise;
(b) the net revenue generated by launching of foreign satellites in the last 10 years, the details thereof, year-wise;
(c) whether India has launched satellites for developed countries as well, the details thereof; and
(d) the steps taken by Government to increase the foreign satellite launch business of the country?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) During the last ten years, i.e., from January 2014 to November 2023, a total of 397 foreign satellites have been launched on commercial basis on-board ISRO's PSLV, GSLV-MkIII (LVM3) and SSLV.
(b) Through launching of 397 foreign satellites, the country has earned a total FE revenue of 157 Million USD and 260 Million Euros.

(c) Yes, Sir. India has launched satellites on commercial basis for various countries including Australia, Austria, Belgium, Canada, Czech Republic, Finland, France, Germany, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Republic of Korea, Singapore, Slovakia, Spain, Switzerland, Netherlands, UAE, United Kingdom and USA.

(d) NewSpace India Limited (NSIL), a Government of India Company under Department of Space and the Commercial arm of ISRO, has been successfully marketing the foreign satellite launch business on-board ISRO's launch vehicles viz., SSLV, PSLV and GSLV-MkIII (LVM3). As indicated above, nearly 400 foreign satellites have already been launched from Indian soil in the past. Further, to take the satellite launch business to the next level, NSIL is working towards manufacturing these rockets through Indian Industry.

****

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
STARRED QUESTION NO. 131

TO BE ANSWERED ON THURSDAY, DECEMBER 14, 2023

ALIGNING ISRO'S ACTIVITIES WITH NATIONAL PRIORITIES

*131. SHRI SUJEET KUMAR:

Will the PRIME MINISTER be pleased to state:

(a) whether Government has a long-term vision for space policy;
(b) if so, the details regarding ISRO aligning its activities with national priorities;
(c) if not, the reasons therefor; and
(d) the details of ISRO's work with regulatory bodies to ensure responsible and sustainable use of space resources?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) to (d) A Statement is laid on the Table of the House.

*****

STATEMENT LAID ON THE TABLE OF THE RAJYA SABHA IN REPLY TO STARRED QUESTION NO. 131 REGARDING 'ALIGNING ISRO'S ACTIVITIES WITH NATIONAL PRIORITIES ASKED BY SHRI SUJEET KUMAR FOR ANSWER ON THURSDAY, DECEMBER 14, 2023.

(a) Yes, Sir. The Government has released the Indian Space Policy – 2023 that clearly delineates the roles and responsibilities of various stakeholders viz. Department of Space, ISRO, NSIL and IN-SPACe. The Policy also provides a level playing field to Non-Government Entities [NGEs] in the space sector by enabling their participation across the entire value chain of space activities in an end-to-end manner.

(b) ISRO has been mandated to focus on R&D in advanced technology, proving newer systems and realization of space objects for meeting national prerogatives. In this regard, ISRO has been aligning its activities with national priorities by working on various space exploration programs, taking progressive steps towards indigenous human spaceflight program viz. Gaganyaan and supporting private sector activities, as detailed below:

- In August 2023, ISRO achieved a major feat as Chandrayaan-3 lander, *Vikram*, successfully soft-landed on the Moon. Subsequently, the rover, *Pragyan*, ramped down on the lunar surface.
- In September 2023, ISRO launched India's first solar observatory – the Aditya-L1 spacecraft.
- In October 2023, ISRO accomplished the first developmental flight of Test Vehicle (TV-D1) with the in-flight abort demonstration of the Crew Escape System (CES). TV-D1 Crew Module was safely recovered from sea with the help of Indian Navy and transported back to ISITE, Bengaluru.
- ISRO has been supporting private sector through sharing of facilities and technical know-how.
- Further, upcoming launches of ISRO such as the X-Ray Polarimeter Satellite (XPoSAT), NASA-ISRO Synthetic Aperture Radar (NISAR) and INSAT-3DS (a metrological satellite) are also aligned to national priorities.

(c) Does not arise.

(d) ISRO joined the Inter Agency Space Debris Co-ordination Committee in 1996 and has been playing an active role regarding Space Debris studies and Mitigation guidelines. India has also been playing a major role internationally on long term sustainability (LTS) of Outer Space as the Chair of LTS working group of United Nations Committee on Peaceful Uses of Outer Space. (UNCOPUOS).

***

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

STARRED QUESTION NO. 133

TO BE ANSWERED ON THURSDAY, DECEMBER 14, 2023

OPENING THE SPACE SECTOR TO PRIVATE PLAYERS

*133. DR. LAXMIKANT BAJPAYEE:

Will the PRIME MINISTER be pleased to state:

(a) whether opening the space sector to private players has heralded a new era in Indian space sector; and

(b) the manner in which it will act as a force multiplier?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) to (b) A Statement is laid on the Table of the House.

*****

STATEMENT LAID ON THE TABLE OF THE RAJYA SABHA IN REPLY TO STARRED QUESTION NO. 133 REGARDING 'OPENING THE SPACE SECTOR TO PRIVATE PLAYERS' ASKED BY DR. LAXMIKANT BAJPAYEE FOR ANSWER ON THURSDAY, DECEMBER 14, 2023.

(a) Yes Sir. The government has announced the Indian Space Policy 2023, which enables end to end participation of NGEs in all domain of space activities. Due to incentives and reform in the space sector, following are the developments and impact:

- The number of Space Start-Ups have gone up, from just 1 in 2014 to 189 in 2023 as per DPIIT Start-Up India Portal.
- The investment in Indian Space Start-Ups has increased to $ 124.7 Million.
- Some NGEs launched their own satellites. Many other Space Industries and Start-Ups are also building their own Satellites & constellations. These satellites shall contribute to applications in agriculture, disaster management, environmental monitoring, etc.
- One NGE launched their sub-orbital launch vehicle.
- A private launchpad and mission control center established within the ISRO campus for the first time by an NGE. Sub-orbital launch by that NGE is scheduled shortly.
- Private companies are exploring satellite-based communication solutions. Private players are increasingly participating in space-based applications and services.
- Satellite integration and testing facilities are coming up in private sector.
- The local manufacturing of the satellite subsystems and Ground systems are being taken up by private sector.
- Indian private space companies are increasingly entering into collaborations and partnerships with international space organizations and companies.

(b) It is expected that private sector will take up independently end to end solution in satellite manufacturing, launch vehicle manufacturing, provide satellite services, and manufacture ground systems. A true force multiplier.

****

O.I.H.

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 1406

TO BE ANSWERED ON THURSDAY, DECEMBER 14, 2023

DEATHS OF SPACE SCIENTISTS

1406. DR. RADHA MOHAN DAS AGRAWAL:

Will the PRIME MINISTER be pleased to state:

(a) the number of space scientists who have died untimely or unusually in the country so far and whether any high-level inquiry has been conducted to know the reasons of their death, if so, the reports thereof; and

(b) whether, keeping in view India's historic success in space science and the supremacy achieved in the international world and international threats, Government will set up a fact-finding committee to investigate the deaths of scientists under mysterious circumstances and ensure that scientists are not threatened again?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) No Sir, there have been no mysterious deaths – untimely or unusually in the Department so far.

(b) Does not arise.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 2089

TO BE ANSWERED ON THURSDAY, DECEMBER 21, 2023

KEY OBJECTIVES OF GAGANYAAN MISSION

2089. SHRI SATISH CHANDRA DUBEY:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that, with success of the Chandrayaan-3 Mission, India has become the first country in the world to land on the southern pole of moon successfully; and

(b) the details of the key objectives of ISRO's Gaganyaan Mission, and the manner in which it will contribute to India's ambitions in human spaceflight?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) With the successful soft landing of the Lander Module of Chandyaan-3 near the South pole (69.37° South, 32.32° East) on the Moon, India has become the first country in the world to do so.

(b) The objective of Gaganyaan programme is to demonstrate Indigenous human space flight capability which includes sending Indian astronauts to Low Earth Orbit (LEO) and bring them back safely. The scope of programme includes;

i. Demonstration of human spaceflight to Low Earth Orbit.

ii. Realization and qualification of the necessary technologies & infrastructure elements to achieve the above.

iii. Establishment of mission control, communication network and essential launch complex facilities for supporting the Gaganyaan programme.

iv. Undertaking two unmanned developmental missions prior to demonstrating human space flight.

Demonstration of indigenous human space flight capability will lead to vision of a sustained human presence in Low earth orbit. Also various key technologies developed for Gaganyaan programme viz. Crew Modules, Life support system, human rated launch vehicle etc. will pave the way for building up of more complex orbital modules and technologies for sustained human presence in space.

****

O.I.H.

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 2211
TO BE ANSWERED ON THURSDAY, DECEMBER 21, 2023

FOREIGN AND DOMESTIC SATELLITES

2211. SHRI SURENDRA SINGH NAGAR:

Will the PRIME MINISTER be pleased to state:

(a) the details of total number of foreign and domestic satellites launched by India in the last decade;
(b) the manner in which this number compares with the previous decade; and
(c) the details of the revenue generated and the projected growth in this sector?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) The number of foreign and domestic satellites launched by India during period 2014-23 were 396 and 70 respectively.

(b) The number of foreign and domestic satellites launched by India during period 2003-13 were 33 and 31 respectively.

(c) The revenue generated from satellite launches during decade 2014-23 is USD157 Million and 260 Million Euros. The corresponding figure during decade 2003-13 were USD15 Million and 32 Million Euros.

As per various global estimates and news outlets, the sector is projected to grow at 6-8 % in coming years.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 2212

TO BE ANSWERED ON THURSDAY, DECEMBER 21, 2023

INDIA'S SPACE PROGRAMME

2212. SHRI BABUBHAI JESANGBHAI DESAI:

Will the PRIME MINISTER be pleased to state:

(a) the status of India's space programme, including recent achievements and upcoming missions;

(b) the steps being taken by Government to strengthen India's position in the global space market and attract international satellite launch contracts;

(c) the investments being made in space research and development to promote scientific advancements; and

(d) the manner in which Government is addressing the challenges of space security, including cyber security threats to satellites and space assets?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) India's space programme is witnessing progressive developments across all domains of space activities viz. space transportation, space infrastructure, satellite applications and human spaceflight.

Major recent achievements include the successful soft landing on the moon [Chandrayaan-3], mission for solar observation [Aditya L-1], progress with regard to

Gaganyaan Programme and increasing participation of private entities in end-to-end space activities.

Major upcoming missions include the X-Ray Polarimeter Satellite (XPoSAT), NASA-ISRO Synthetic Aperture Radar (NISAR) and INSAT-3DS (a meteorological satellite).

(b) The NewSpace India Limited [NSIL], a Public Sector Enterprise under Department of Space, has been offering commercial satellite launch services on international market through launch vehicles of ISRO. Further, the Indian Space Policy 2023 has opened up the sector for enhanced participation of private sector, which is expected to further strengthen India's share in global space economy.

(c) Government has been funding various R&D programs in the domain of space science, technology and applications, through ISRO as the national space agency.

Further, private sector investments are also being encouraged in this sector with the advent of Indian Space Policy – 2023, which envisages private sector to take up end-to-end activities in space domain.

(d) ISRO had taken steps towards enhancing security features on space assets through encryption of the Payload data and making Telemetry & telecommand encryption, as a standard practice for all spacecraft. Further, to tackle the challenges of space debris, the ISRO System for Safe & Sustainable Space Operations [IS^4OM] has been set up.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 2213

TO BE ANSWERED ON THURSDAY, DECEMBER 21, 2023

STEPS TO ENHANCE INTERNATIONAL COLLABORATION IN SPACE EXPLORATION

2213. SHRI BABUBHAI JESANGBHAI DESAI:

Will the PRIME MINISTER be pleased to state:

(a) the steps being taken to enhance international collaboration in space exploration and technology development;

(b) the measures which are in place to ensure the responsible use of space resources and present space debris;

(c) the details on the utilization of satellite technology for various socio-economic and environmental applications;

(d) the manner in which Government is supporting the development of private space industry in the country; and

(e) the initiatives being taken by Government to promote space education and awareness among the country's youth?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) Several steps are being taken to enhance international collaboration in space exploration and technology development such as organizing bilateral meetings on the sidelines of international conferences both in India and outside; Facilitating the interaction between foreign and Indian industries/ academia; Taking up space cooperation as part of various Government-level Joint Committees. Such steps are expected to lead to MoUs/ Agreements, forming of Joint Working Groups and implementation of specific activities that are mutually agreed to.

(b) In 2022, ISRO System for Safe and Sustainable Operations Management (IS^4OM) was established, to ensure concerted efforts towards safe and sustainable use of outer space.

Several mitigation measures are practiced while conducting space activities such as passivation of upper stages of launch vehicles, Launch COLlision Avoidance (COLA) assessments, close approach analyses for operational satellites, post mission disposal of geosynchronous satellites to graveyard orbits, and end-of-life de-orbiting of LEO (Low Earth Orbit) satellites and rocket stages.

Continual and dedicated efforts are pursued to improve the compliance level with various space debris mitigation guidelines.

Efforts are also underway to set up observational facilities, namely radars and optical telescopes, for tracking and monitoring of space object, including space debris.

(c) Space-based applications derived from remote sensing, satellite communication and navigation have become an integral part of the value chain of the user agencies and user communities addressing various socio-economic and environmental applications. Satellite technologies have directly and indirectly benefited in areas like weather prediction, disaster management, DTH, television broadcasting, digital connectivity, positioning services, Natural resources survey, crop forecasting, search & rescue operations and several others. Besides, space technology-based applications are put to use in several flagship schemes of Government such as PMFBY, AMRUT, PMKSY, GeoMGNREGA, PM-Gatishakti.

(d) Government has taken several steps to support the development of private space industry in India, which include creation of Indian National Space Promotion and Authorization Centre [IN-SPACe] as the single window agency to authorize, promote and handhold space activities of Non- Government Entities. Further, the Indian Space Policy – 2023 has been released, clearly defining the roles of ISRO, NSIL and IN-SPACe.

(e) ISRO has instituted following programmes for promoting space education among young minds:

- Space Technology Cells (STCs) at premier technical institute like IISc, IITs etc.
- Regional Academic Centre for Space (RAC-S) – 6 nos.,
- Space Technology Incubation Centre (STIC) – 6 nos.,
- *Yuva Vijyani Karyakram* Young Scientists Programme (YUVIKA): For young high school students involving two weeks training, hands on skills, interaction with eminent scientists and facility visit.
- Space Tutor Programme: Enabling NGOs & Institutions in promoting Space Education & outreach across the country.
- *Antariskh Jigyasa Portal:* For educating students online in space Science and Technology.
- Outreach through Space Exhibitions/ Conferences/ Museums.
- Space on Wheels, with six such units covering areas across country.
- Indian Space Science & Technology (IIST) and Indian Institute of Remote Sensing (IIRS), which offer short and long term courses.

****

O.I.H.

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 2215

TO BE ANSWERED ON THURSDAY, DECEMBER 21, 2023

COMMERCIAL VIABILITY OF SATELLITE MANUFACTURING AND LAUNCHING

2215. MS. INDU BALA GOSWAMI:

Will the PRIME MINISTER be pleased to state:

(a) whether the Ministry has examined the commercial viability of satellite manufacturing and launching; and

(b) if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) Yes Sir. The commercial arm of Indian Space Research Organisation (ISRO) and the Government of India company under Department of Space, the NewSpace India Limited (NSIL), a schedule 'A' CPSE, has been undertaking space business viz. satellite manufacturing and launching; providing launch services and satellite based services to international and domestic customers based on their commercial viability. The commercial space business activities of NSIL have brought in substantial revenue and profit for the company, year on year.

(b) Especially with regard to satellite manufacturing and launching, NSIL had built and launched GSAT-24 communication satellite for meeting Direct-to-home (DTH) service needs of M/s. Tata Play, through its own investment. NSIL undertook this activity purely based on its commercial viability.
In future NSIL proposes to undertake many such satellite manufacturing and launching activities as they are found to be commercially viable for the company.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 2216

TO BE ANSWERED ON THURSDAY, DECEMBER 21, 2023

PRIVATE SECTOR PARTICIPATION IN SPACE INDUSTRY

2216. MS. KAVITA PATIDAR:

Will the PRIME MINISTER be pleased to state:

(a) the initiatives and policies implemented by Government to encourage private sector participation in the space industry; and

(b) to what extent has this approach shaped the growth and the revenue generated till date, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) Yes sir, towards this, The Indian Space Policy – 2023 has been formulated by the Government to provide regulatory certainty to space activities by various stakeholders, in order to create a thriving space ecosystem. Under this policy, Indian National Space Promotion and Authorization Centre (IN-SPACe) has the responsibility, among others, to work with industry – both national and overseas – to promote identified space activities and establish India as a preferred service provider for global requirements of products/services in the space sector. IN-SPACe has been formulating several schemes such as Seed fund Scheme, Pricing Support Policy, Mentorship support, Design Lab for NGEs, Skill Development in Space Sector, ISRO facility utilisation support, Technology Transfer to NGEs, access to capital intensive test facilities established

through public expenditure. etc which is expected to aid the NGEs in enhancing their capability to manufacture the space systems and expand the Indian space economy.

(b)

- The number of Space Start-Ups have gone up. from just 1 in 2014 to 189 in 2023 as per DPIIT Start-Up India Portal.
- Some NGEs launched their own satellites. Many other Space Industries and Start-Ups are also building their own Satellites & constellations. These satellites shall contribute to applications in agriculture, disaster management, environmental monitoring, etc.
- One NGE launched their sub-orbital launch vehicle.
- A private Launchpad and mission control center established within the ISRO campus for the first time by an NGE. Sub-orbital launch by that NGE is scheduled shortly.
- Private companies are exploring satellite-based communication solutions. Private players are increasingly participating in space-based applications and services.
- Investment in Indian Space Start-ups has increased to $124.7 Million in 2023.

****